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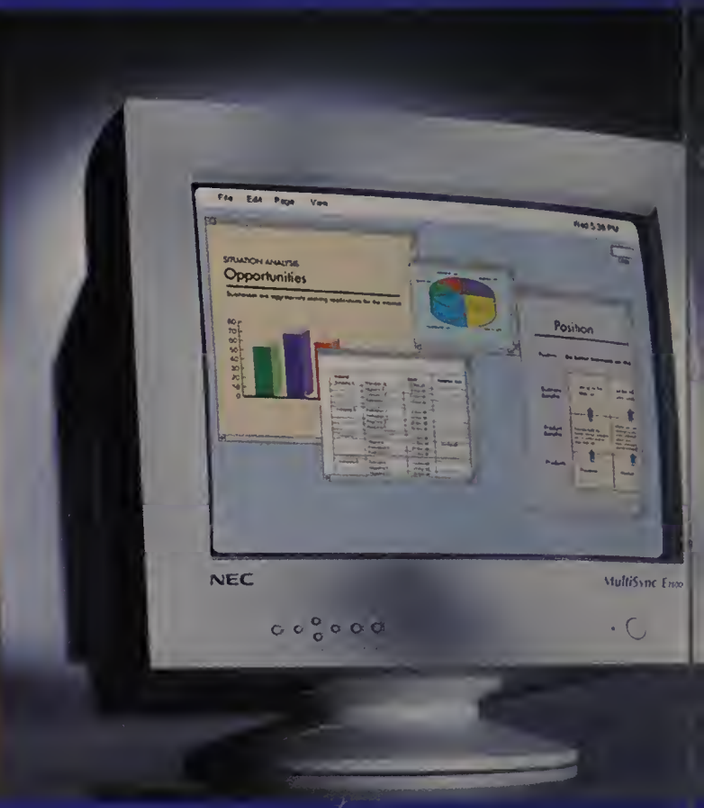

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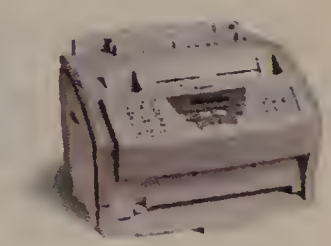

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PC WORLD

JUNE

VOLUME 16 ◆ NUMBER 6

COVER STORY

98 **400-MHZ PENTIUM IIs: THE GREAT LEAP FORWARD**

We must have died and gone to PC heaven. Just-introduced 350- and 400-MHz systems really are as fast as Intel promised—up to 21 percent zippier than a PII-333. Better yet, one of these babies, complete with souped-up memory and a blazing-fast bus, could set you back less than three grand.

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110 **WINDOWS UTILITIES: RX FOR YOUR PC**

REVIEW Hey, working with Windows can make any system sick. Our prescription: the sturdiest file managers, compression software, file viewers, disk scanners, uninstallers, and defraggers—plus the best all-in-one utility suites money can buy.

135 **YOU'VE GOT E-MAIL**

HOW-TO Ping! Another piece of e-mail just hit your in-box. You might not have time to read all your messages, but be sure to read this: 68 tips that will help you block spam, speed up downloads, minimize typing, and streamline your in-box.

158 **DIFFERENT NOTES FOR DIFFERENT FOLKS**

REVIEW There's a laptop for everyone, or at least that's the way it seems. We tested, tortured, docked, and dropped 14 portables in four flavors—desktop replacements, thin and light models, subnotes, and ruggedized—including 4 hot new Pentium II notebooks.

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185 **CUT YOUR OWN CDs**

REVIEW Zip or Jaz drives are for wimps. For permanent portable storage you can share, you need to burn your own CDs. We took 7 recordable and 9 rewritable drives for a spin, and we also got a glimpse at the future—a huge-capacity DVD-ROM drive.

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Frazzled by endless meetings, a fringe of Post-it notes everywhere, and paper up the wazoo? You need an intranet. New easy-to-use appliances—Web-savvy hardware and software combos—make sharing information with colleagues as simple as launching your browser.

Additional material available on PC World Online: www.pcworld.com

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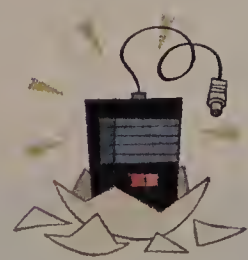

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TOP 100

227 PENTIUM II-333s: THE NEXT HOT DEAL?
online There's a new sweet spot in desktops. Fully loaded PII-333s give you everything you could want for less than $2800. Case in point: Our new power leader, Gateway's G6-333, turned in the highest PC WorldBench score ever. Not bad for $2684.

230 POWER DESKTOPS
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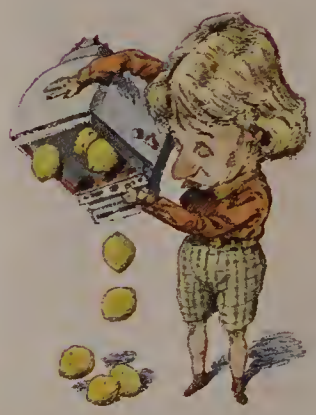

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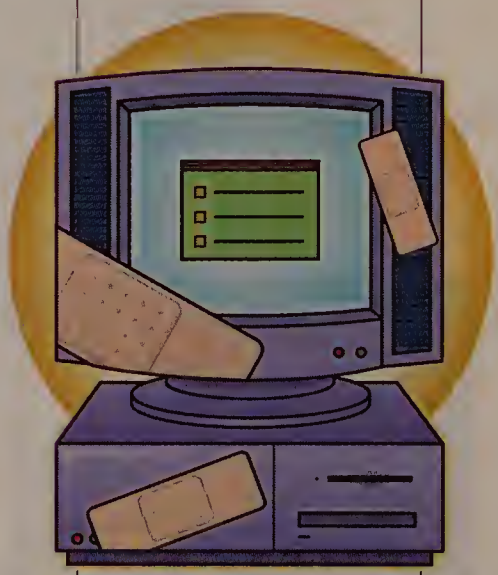

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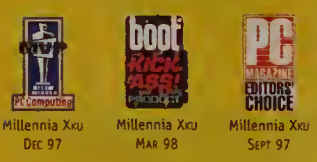

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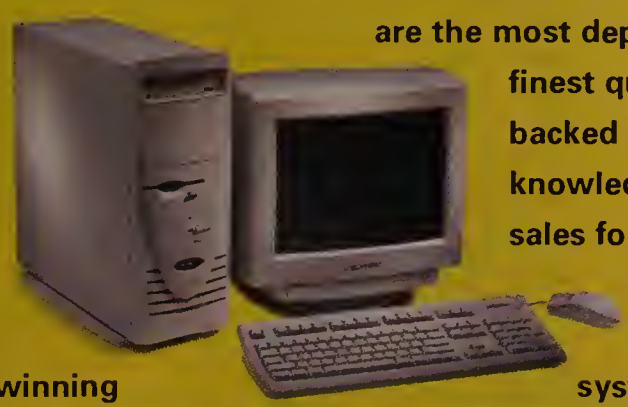

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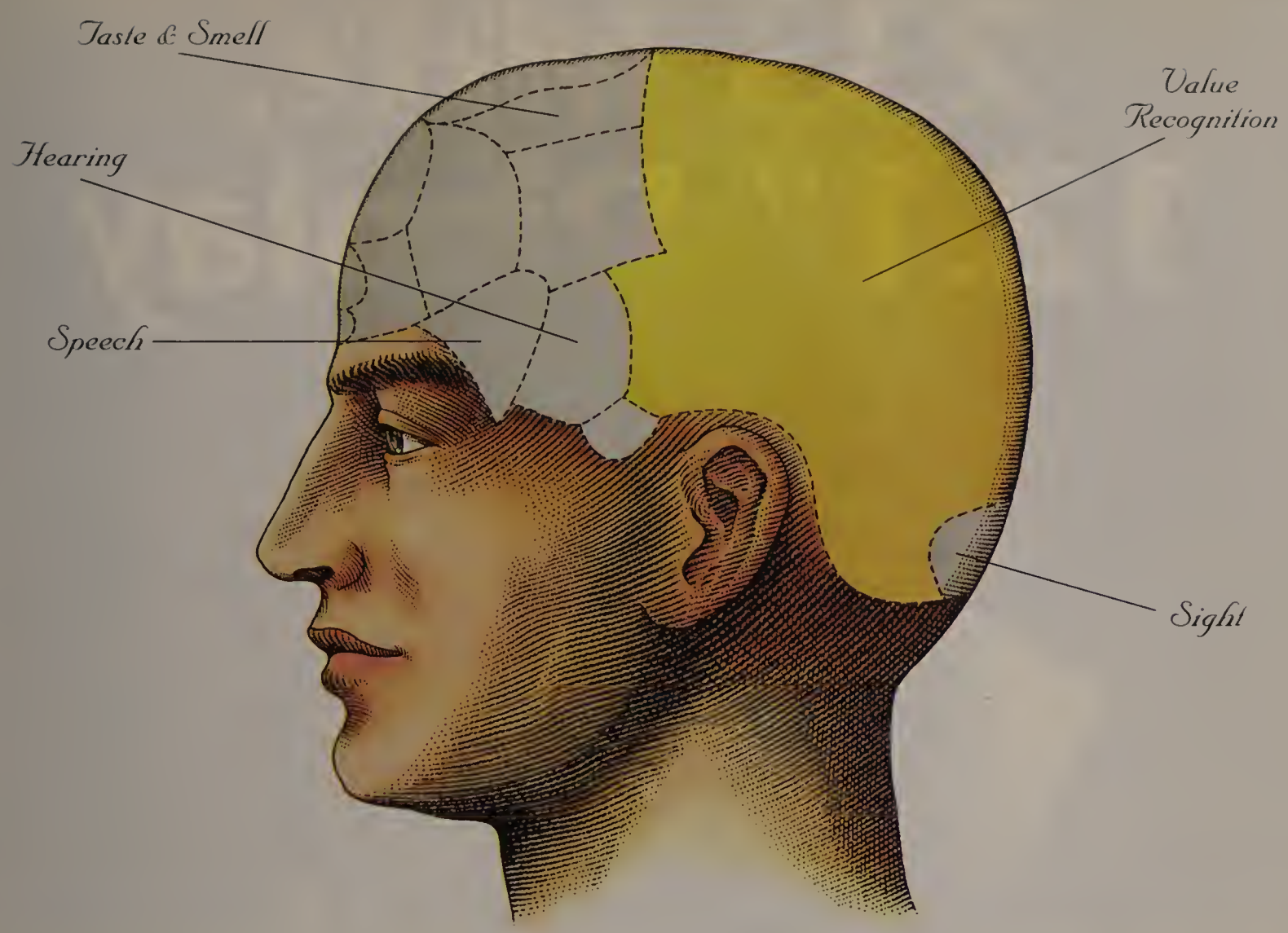

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Flattery Will Get You Bad Publicity

MICROSOFT'S SHINING IMAGE once blinded the public to criticism of the software giant's business practices. Revelations in the U.S. antitrust action dimmed the shine. Aggressive Microsoft pronouncements added a splotch here and a scratch there. Microsoft's response? A plan to hire PR firms to sit right down and write a bunch of letters, and make believe they came from us.

The *Los Angeles Times* reported that the plan hinged on "...a number of unusual and some say unethical tactics, including the planting of articles, letters to the editor and opinion pieces to be commissioned by Microsoft's top media handlers but presented by local firms as spontaneous testimonials."

Unlike suborning perjury, suborning flattery is not a crime. But it does leave a nasty smear on a company's image. It's scary to speculate about Microsoft plans to polish its image in the aftermath of the fake–love-letter debacle.

Microsoft's missteps divert attention from the real issue—restoring the possibility of broad competition in software, along with a broad range of options for you. The company is doing everything in its power to minimize choice in the marketplace. Microsoft has tried to co-opt software environments that could pose a viable alternative to Windows. And, of course, it has blunted Netscape's browser attack with a free browser of its own.

Unlike suborning perjury, **suborning flattery** is not a crime. But it does leave a **nasty smear** on the image.

COMPETITORS CHOOSE STEALTH

THE MANEUVERS OF Microsoft's competitors don't do much to foster out-and-out competition either. The rival companies want to compete with Microsoft in the operating systems business without actually entering that business. In essence, they want to compel Microsoft to distribute, within Windows itself, products that will compete with Windows. This stealthy approach achieves the noteworthy feat of treating a monopolist unfairly. It's as though AMD, Cyrix, and IDT demanded that Intel embed their chips in the Pentium II.

Sun shouldn't need stealthy tactics. In its 1997 fiscal year, Sun had revenues of $8.6 billion and profits of $762 million. The company is a brilliantly managed technological powerhouse. It has everything it needs to compete with Microsoft in the sale of operating systems for Intel hardware. In addition to Java, Sun has Solaris, a full-fledged version of UNIX that already runs on Intel processors.

But Sun hasn't faced up to some of the requirements for challenging Microsoft. It has always assumed that computers go only to companies that have hosts of technical specialists. Sun has also underestimated the need to inspire the creation of off-the-shelf applications that run under its operating systems. Oddly, the company's ridicule of PCs has undermined the broader acceptance of its own products. Tens of millions of users know from personal experience that PCs are useful.

HOW TO RESTORE CHOICE

WE CAN'T CHANGE history, but we can hope for changes that would permit competition and give you a choice of operating system. Ironically, one idea for such a change comes from another high-tech arena dominated by another aggressive monopoly, Intel. Competition among microprocessors has emerged because non-Intel chip makers have successfully defended their right to make microprocessors with the same instruction set as Intel's. The software equivalent of hardware instructions is the family of application programming interfaces in operating systems and similar environments. APIs are the points at which programs connect to the operating system.

Microsoft has used control of APIs to dominate other software companies. By the time a competitor can produce an operating system that matches Microsoft's APIs, Microsoft has changed them again. Only transferring control of APIs to an industrywide organization would level the playing field for operating systems and applications. All the energy wasted creating and fighting exclusionary business tactics, lobbying, and generating bogus popular support could pour into the creation of better software.

If control of APIs were shared, the biggest winner would be you. No longer would you have to take whatever Microsoft operating system came with your computer. You could choose your operating system based on merit and price, without having to abandon your current programs and files. You could shop, compare, and choose. Microsoft's advantages in research and development spending and staff would give it a huge edge in producing what you wanted. But you would have a choice, other companies would have a chance, and Microsoft's software would improve faster.

Phil Lemmons is editorial director of PC World. ■

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YOUR TAKE ON: Computer repairs ◆ TV/audio PC ◆ Compatibility testing

STYLE VS. SUBSTANCE

I COULDN'T AGREE with Cathryn Baskin more ["Windows—and Bugs—Everywhere," *Up Front*, March 1998].

We are witnessing a victory of style over substance, and it is becoming a rout. Basic functionality is going backward. Hardware and software manufacturers race to add pretty paint jobs, chrome plating, and automatic everything, but the essential machinery under the hood is being crippled or at best ignored.

Microsoft updates Word with all kinds of Web enhancements but blithely ignores the basic need to write to a file format understood by even the most recent prior version. My big-name Pentium II-300 won't display a few of the icons on the standard toolbar of the world's most popular spreadsheet, because the display cannot refresh that particular screen fast enough at 1024 by 768 resolution and 256 colors. Say what?!

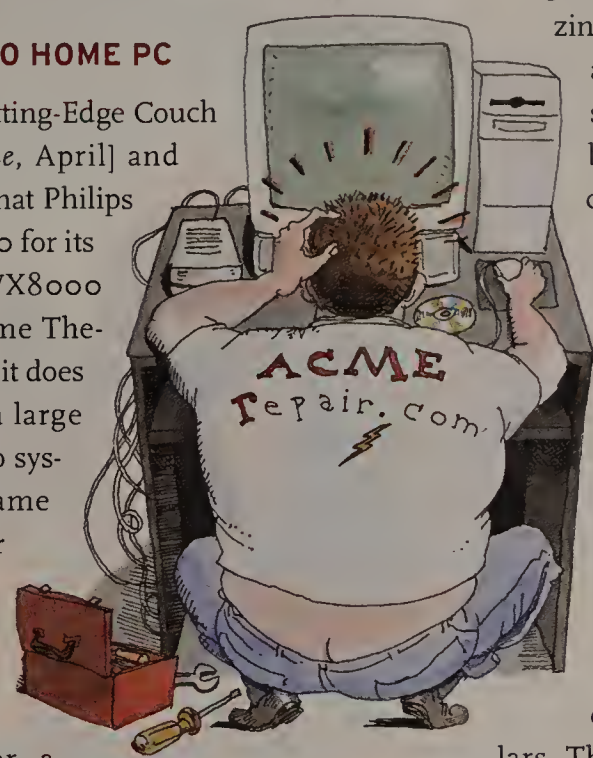
I don't need cash register sounds in my accounting program, unsolicited pearls of wisdom exploding onto the screen, or dancing paper clips and all these other features that deliver little more than enhanced cuteness. I don't need applications telling me what I want, resizing their main window for no apparent reason every time I launch the program, or adding and removing toolbar icons without notice or request. I need apps that are rock-solid from top to bottom—and can help me get my work done.

John W. Groo, Moab, Utah

THAT $5000 HOME PC

I READ "The Cutting-Edge Couch Surfer" [@*Home*, April] and find it amazing that Philips is charging $5000 for its Pentium-233 DVX8000 Multimedia Home Theater, especially as it does not come with a large screen or a stereo system. For the same price, a PC buyer can purchase a Gateway Destination DMC that includes a 36-inch monitor, a DVD drive, a 333-MHz processor, and a high-fidelity sound system. Similarly, Compaq offers a $5000 system with a 36-inch monitor and a DVD drive. TigerDirect's PC Cinema, another TV-based system, also has built-in DVD—but its pricing starts at around $1000.

Paul Katz, McLean, Virginia



INITIALLY, I HAD the same reaction as you: Why should anyone pay $5000 for a 233-MHz Pentium MMX computer? Then I found out how confusing PC/TV "convergence" is becoming for the consumer. Two high-end audio/video magazines gave the DVX8000 a fantastic rating and said everyone should buy one. Why? It all comes down to focus. *PC World* looked at the computer aspects of the machine. The audio/video magazines zeroed in on two key features: the DVD player and one not even mentioned in your review, the line doubler. Line doublers for high-end video can cost up to $15,000 dollars. The audio/video magazines gave both the line doubler and the DVD player of the DVX8000 very high scores. In their eyes, you were getting a $15,000 line doubler and an $800 DVD player for $5000. The PC was just frosting on the cake.

What does this mean for the future, when the lines between PC, audio, and TV blur even more? I haven't the slightest idea, but it sure will be interesting.

Ron Critchfield, Woodinville, Washington

MORE DEBATE ON PC REPAIRS

AS A REPAIR TECHNICIAN I looked into employment opportunities at some of the chain stores when I was searching for work. Not one of them was willing to pay even close to the average offered by technical contract firms that service major corporations or what small local service providers paid. Many of these local companies paid $22,000+ for beginning technicians and $28,000+ for people with experience—plus much better benefits—while the chain stores paid $7.50/hour ($15,600). So what do you think they have as technicians? Glorified clerks, people who have no training or ability. You ▶

CROSS FIRE

"PC Repair Rip-Off!" Was No Surprise

THE ARTICLE "PC Repair Rip-Off!" [April] was quite interesting but hardly surprising. I believe that the computer industry as a whole is one of the few areas of commerce in which the consumer—whether private or business—is routinely provided with subpar products, sales help, support, and repair. Despite the presence of a few bright spots, I cannot think of another product category where consumers would tolerate the incompetence, lies, poor quality, and daily problems that everyone who owns a computer regularly experiences.

Bruce Baker, Overland Park, Kansas

Repair Tests Were Unfair

WHAT A BOGUS article! As an A+ certified computer repair specialist, I couldn't believe you created such artificial problems. You simply set up unsuspecting technicians for a fall. IDE cables, once tested and approved by a vendor like Compaq, don't go bad, period. Then you send a "consumer" to service centers saying the PC "just started running slow." Did you expect technicians to check for SIMMs that jumped from socket to socket by magic? And were techs supposed to ask if you had taken a knife to your IDE cable? Some customers might be offended.

Tracey A. Miller, Kenosha, Wisconsin

ILLUSTRATION JOE CIARDIELLO

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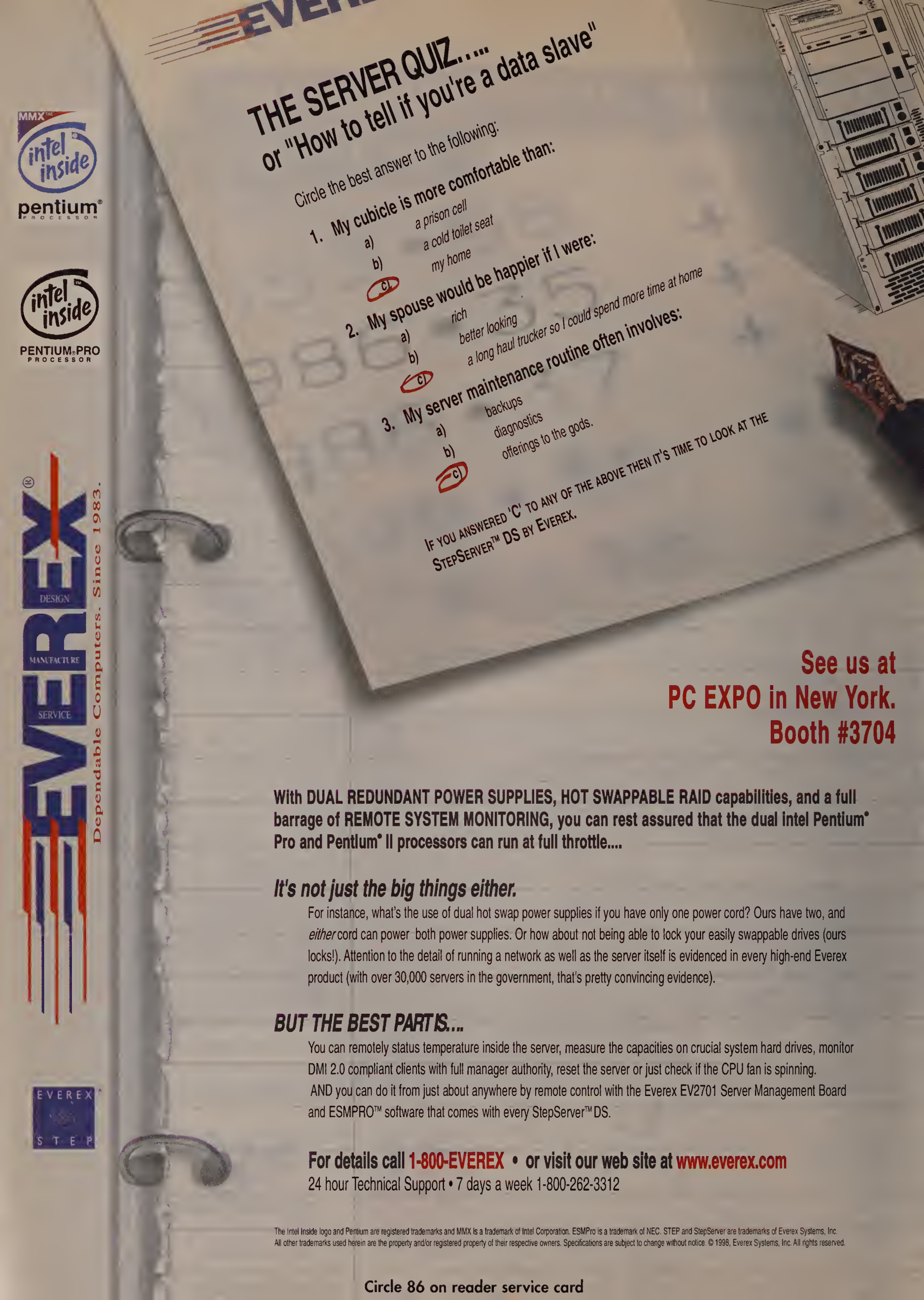
EVER
THE SERVER QUIZ.....
or "How to tell if you're a data slave"
Circle the best answer to the following:
1. My cubicle is more comfortable than:
a) a prison cell
b) a cold toilet seat
c) my home
2. My spouse would be happier if I were:
a) rich
b) better looking
c) a long haul trucker so I could spend more time at home
3. My server maintenance routine often involves:
a) backups
b) diagnostics
c) offerings to the gods.
IF YOU ANSWERED 'C' TO ANY OF THE ABOVE THEN IT'S TIME TO LOOK AT THE STEPSERVER™ DS BY EVEREX.
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Booth #3704
With DUAL REDUNDANT POWER SUPPLIES, HOT SWAPPABLE RAID capabilities, and a full barrage of REMOTE SYSTEM MONITORING, you can rest assured that the dual intel Pentium® Pro and Pentium® II processors can run at full throttle....
It's not just the big things either.
For instance, what's the use of dual hot swap power supplies if you have only one power cord? Ours have two, and either cord can power both power supplies. Or how about not being able to lock your easily swappable drives (ours locks!). Attention to the detail of running a network as well as the server itself is evidenced in every high-end Everex product (with over 30,000 servers in the government, that's pretty convincing evidence).
BUT THE BEST PART IS....
You can remotely status temperature inside the server, measure the capacities on crucial system hard drives, monitor DMI 2.0 compliant clients with full manager authority, reset the server or just check if the CPU fan is spinning. AND you can do it from just about anywhere by remote control with the Everex EV2701 Server Management Board and ESMPRO™ software that comes with every StepServer™ DS.
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intel inside PENTIUM PRO PROCESSOR
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COMING UP

IN JULY

WINDOWS 98 IS HERE

After a year of delays, Windows 98 is about to hit the streets. Will Microsoft's latest live up to promises of enhanced performance and troubleshooting? *PC World*'s editors give you the lowdown.

WORLD CLASS: TOP PRODUCTS OF 1998

Here they are—the best products of the past year in over 60 categories, covering PCs, peripherals, software, and online services. Plus, our readers weigh in on the companies that provide the best service and support.

TURBO WEB!

Does your Web surfing feel like Web slogging? We check out 28 products, from productivity tools to audio and video add-ons, designed to make your work on the Internet faster and better.

HARD DRIVES FOR THE PEOPLE

PC feeling cramped? Ever try to replace an aging hard drive all by yourself? Our roundup ranks the best drives based on value, ease of use, performance, and tech support.

ALSO NEXT MONTH

▶**Top 100:** Power desktops, budget desktops, notebooks, and home PCs, plus the top printers, monitors, graphics boards, and modems.

▶**Find a Job on the Web:** Here's how the Internet can help you find that dream job or employee. We highlight top recruitment sites and time-saving tips.

▶**Here's How:** *Answer Line* on PC obsolescence, *Windows Tips* on Win 98 system tools, *Upgrade Guide* on installing a DVD drive.

PC WORLD

get the level of competence you pay for. These places are charging full rate for service but they are hiring at cut rate.

Peter Boyle, High Point, North Carolina

NO DOUBT many bozos are in the repair business. But often, customers lie when you ask them if they have made changes or have "tweaked" the hardware. Or they'll tell you they run ScanDisk and defrag religiously, but when you look at the drive's properties, it has not been done for years. Customers lie even when there is no warranty situation. You wouldn't lie to your doctor about your symptoms; why lie to the computer repair person?

Steve Atkinson, Channing, Michigan

TESTING, TESTING

YOUR PRODUCT TESTING seems to be run in a vacuum, on "clean" machines, because you report no interference by one hardware or software item on another. But what I want to know is whether I can do an autoinstall or must manually install new software—and whether, in either case, the new product will cause conflicts with my current machine and software once I install it. I'm not getting this information from you or anyone else right now. What I am getting is discounted $39.95 software packages that either don't work with the software on my machine or that cause it to hang or crash, and sometimes even disable hardware such as a sound card that worked fine before.

A. L. Meszaros, Blacksburg, Virginia

Editor's response: Thanks for the input, but there's a very good reason why *PC World* and other computer publications can't provide the level of compatibility testing you seek. The conflicts and crashes you suffer are, for the most part, closely tied to the configuration of your hardware, the combination of software you use, bits of applications left on your PC after you delete an app, and so on. Compatibility tests that work for you wouldn't fit other PC users' systems.

That's not to say we ignore the issue of compatibility. Many of our columns and articles—*Bugs and Fixes, Here's How*, and features like March's "Windows 95 Headaches (and How to Cure Them)"—are designed to help you deal with this problem. **—Tracey Capen**

154 CURSORS

AFTER READING "Best Free Stuff Online" [April], I downloaded the program 154 Cursors. I discovered, though, that every file in it is an animated cursor file. There is no setup or read-me file explaining how to install the software or how to get it to function properly. Please advise.

Christian Matthews, Brampton, Ontario

Editor's response: To use the downloaded cursors, place them in the Windows/Cursors directory. Then double-click *Mouse* in Windows 95's Control Panel. Click the *Pointers* tab. Highlight a pointer you want to replace with one you've downloaded. Click the *Browse* button and scroll the list until you find the replacement. Double-click it. Repeat the process to make other replacements. Click *OK*. **—Michael Lasky**

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

CORRECTIONS AND CLARIFICATIONS

APRIL'S "Best Free Stuff Online" mentioned the Desktop Themes Heaven site; several readers have reported that their systems were infected with a virus after downloading files from this site.

In April's *PCW Advocate, The Fine Print* said users who return PCs to Royal Computer for a refund are charged full retail for opened software packages. In fact, Royal charges only a percentage of that price. For example, Royal deducts $75 from the refund on a returned PC with an opened copy of the $149.99 Lotus SmartSuite.

In April's "Painless Web Pages," we implied that Adobe's PageMill 3.0 can't handle sound. It can—but you must go to the help menu to accommodate it; other products make inserting sound a one-click job.

PC World regrets the errors.

Clarification: In an April *Top of the News* story ("Flawed Privacy Agreement Lets It All Hang Out"), the author said he found his own unlisted phone number via Information America's KnowX Web service. The author actually found the number by checking property and other records on KnowX that contained the name of his wife and her listed phone number. KnowX does not publish unlisted phone numbers.

NEC notebooks can go places other notebooks can't. The future, for example.

Versa 5000 Series Notebook

Everything you expect in a notebook except the weight.

The choice between weight and features is over. The Versa 5080X is the full-featured, no-compromise multimedia notebook. It's armed with a superfast Intel processor and a 13.3" XGA screen for vibrant images that will bring your work, and especially your multimedia presentations, to life. And all this power comes to you in one of the thinnest and most lightweight forms around to give you the ultimate in mobile computing.

"Thin is in, and NEC's Versa 5080, at 4.9 pounds and 1.5 inches thick, is a power user's full-featured laptop with a waifish form factor."

BYTE Magazine -Mar. 1998

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- SuperDisk™ 120MB Drive Pak for UltraSlim™ VersaBay™
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- Integrated 16-Bit Stereo Sound
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- USB and 4Mbps Fast Infrared Ports
- Microsoft® Windows® 95
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- PCI Bus Architecture with NeoMagic 128-Bit Graphics Accelerator
- Integrated 16-Bit Stereo Sound
- 32-Bit CardBus and Zoomed Video Support
- USB and 4Mbps Fast Infrared Ports
- Microsoft Windows 95
- 5 Pounds** and 1.5" Thin

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MMX™ intel inside pentium® PROCESSOR

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With NEC notebooks, you get a lot more than just today's best technology. You also get an ongoing membership to tomorrow's technology. As a company with resources of nearly $40 billion, we not only can give you one of the best vantage points from which to preview upcoming products and technologies, we'll also give you the security of knowing that you've chosen a technology partner that's in it for the long haul. And one with a commitment to notebooks that nobody else can match. We're the company that invented the notebook and we're the company that's reinventing owning a notebook. Take our telephone service, for example. When you call, help is usually no more than 90 seconds away. You'll also be protected by everything from a 30-day money-back guarantee to free 24 x 7 technical support.

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Portable Computing Direct Shopper -Mar. 1998

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- Integrated 56Kbps* Modem
- PCI Bus Architecture with NeoMagic 128-Bit Graphics Accelerator
- Stereo Speakers and Subwoofer with 3-D Surround Sound and Yamaha Wavetable
- 32-Bit CardBus and Zoomed Video Support
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- Stereo Speakers and Subwoofer with 3-D Surround Sound and Yamaha Wavetable
- 32-Bit CardBus and Zoomed Video Support
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PC Computing A List Top Pick SPL300: 2/98, 3/98, 4/98

Windows Magazine 3/98:
WinList SPL333

boot 3/98:
Kick Ass Award SPL333

PC Magazine 12/97:
Editors' Choice SPL266

PC Magazine 1/98:
Best of 1997 SPL266

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PC MAGAZINE Best of 1997

PC MAGAZINE EDITORS' CHOICE December 2, 1997 ALL-IN-WONDER PRO

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ATI

Can't Live With AOL, Can't Live Without It

Sure, the largest online service is a pain to use. But there are ways to make it less frustrating.

ILLUSTRATION: MARC ROSENTHAL

OKAY, I CONFESS: Despite the junk mail, annoying pop-up ads (you know, the ones trying to sell you everything from CD-ROM encyclopedias to low-interest credit cards), and often agonizingly slow service, I still subscribe to America Online.

Does the service drive me crazy? Sure. Am I perturbed about the $2-a-month rate hike? You bet. Still, like 11 million other folks in PC land, I haven't pulled the plug. I stopped using AOL as my primary online connection long ago: Like many *PC World* readers, I connect to the Web directly through a national Internet service provider. But for on-the-road hookups, access to select message boards, and a simple online solution for my kids, I haven't found anything better.

Don't get me wrong: I'm not an apologist for AOL. By all rights, the Reston, Virginia–based service should have gone offline long ago. Over the years, it has treated customer privacy like a commodity to be bought and sold. Trying to connect during peak hours remains a gamble, and exchanging e-mail with non-AOL subscribers can be an exercise in frustration. (The company's policy is to deliver AOL-to-AOL mail before external e-mail when its network is overburdened.) I can think of a dozen reasons to log off for good and say *sayonara* to the headaches.

WHAT AOL DOES BEST

BUT I CAN ALSO think of some pretty powerful reasons to stay with the service we love to hate. Yours may differ, but here are mine:

Easy access from anywhere. When it comes to nationwide access to the Web and e-mail, America Online offers big benefits for folks who travel for work or pleasure: AOL's 560-odd points of presence in the United States give you direct access from virtually every major geographic area of the country. Though a handful of other national ISPs offer even more widespread access, no competitor beats AOL's ease of connecting nationwide. You don't even have to lug a notebook around. Quite a few business-oriented hotels and conference centers have PCs loaded with AOL software, so you can log on, get your mail, and be done with it. As a backup, I carry one of those ubiquitous AOL installation disks in my briefcase.

Flexible account setups. AOL lets you establish five separate screen names—each with its own privileges and preferences—on a single account. I don't have any surveys to prove it, but I bet this one feature keeps many families and small businesses logging on to the service. It's why AOL is a staple at my house. With all the concerns about kids online, AOL offers one of the smartest solutions around for families with young children.

Without a lot of effort, parents can set up accounts tailored to their children's specific needs and maturity level ("Kids Only" for 7-year-old Patty, for example, and "Young Teen" for 14-year-old Margaret). It's not a substitute for watching what your children are doing online, but it goes a long way toward ensuring that the content they access will be age appropriate. While some ISPs also allow multiple ▶

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names on a single account, AOL alone offers this type of flexibility.

Community. For all its quirks, AOL has cultivated powerful and supportive communities—for everyone from networking professionals to stay-at-home parents. Sure, much of the information on AOL can be found elsewhere on the Web (Netscape has even launched its own "virtual community"), but many individuals would be loath to forfeit the relationships they've spent years building on AOL. Aren't they worth an extra $2 a month?

MAKING THE MOST OF IT

IF NECESSITY or desire impels you to stay with America Online, there are several ways to make the best of the less-than-perfect service. Here's my advice for making your online time as productive and painless as possible:

Stop those annoying ads. Are you tired of logging on to AOL only to be greeted by an ad for a new CD-ROM encyclopedia or AOL Visa credit card? You can reduce (though maybe not entirely eliminate) what AOL quaintly refers to as "pop-up offers." Just type keyword **marketing preferences** and specify which type of products—if any—you want to receive advertising notices about. I get enough unsolicited sales pitches by phone and e-mail, so I chose to turn off all pop-ups. (Try as I might, though, I've never managed to suppress the pitch for Internet Explorer 4.0 that pops up when I log off.)

> Are you tired of logging on to AOL only to be greeted by an ad? You can reduce the "pop-up offers" with a few mouse clicks.

And remember, if you have more than one screen name on your account, you'll need to complete the marketing preferences screen for each separate ID.

Track your time online. If you're like me, you go online just to check e-mail, then wind up spending an hour or more browsing the selections at your favorite online store or checking stock quotes. These online wanderings aren't a problem if your account provides you with unlimited access. But if you've opted for one of AOL's low-price plans ($4.95 for 3 hours or $9.95 for 5 hours), you'll need to keep close tabs on your online time. Once you exceed your baseline usage, every extra hour you're connected costs $2.50. Monitor your minutes with AOL's running clock. In version 3.0 for Windows 95, simply click the *Go To* menu and scroll down to the online clock. If you've selected a limited-use plan, keep a file of your monthly connect time—and refer to it when your bill comes in. If you find any discrepancies, report them immediately. Type the keyword **billing** to view a record of your monthly hours logged on and get quick e-mail access to customer service.

Control your mail. Most AOL regulars are hardly strangers to junk e-mail: Get-rich-quick schemes, sales pitches for cheap hardware and software, offers of "XXX" adult entertainment—if you can name it, a bulk mailer is probably spamming it online. AOL has instituted several controls to help users put a stop to junk mail, and you should take advantage of each of them. You can find a list of suggestions by clicking on *Mail Center* in the Mail menu, then selecting *Mail Controls*. For security purposes, the controls are accessible only by the holder of the master AOL screen name. Making use of these tactics won't eliminate all the junk, but it should reduce the slag heap considerably. AOL also recommends forwarding all junk mail to "TOSSpam," so the staff can review it and add the sender to its list of blocked mailers.

If you share your account with children, note that you can customize mail and download activity for each screen name on your account. Your choices run the gamut from no restrictions on e-mail to halting all incoming messages. You can block mail from specific addresses or allow it only from a list of correspondents you deem acceptable.

Each choice gives you the option of stopping all mail with attachments. For downloads, the blocking choices include files from AOL or those from the Internet. As with choices you make in the marketing preferences section, however, the mas- ▶

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WHEN TO PULL THE PLUG

ARE YOU A disgruntled AOL subscriber wondering whether it's time to move on? The time is probably right if:

- You rely on AOL for time-sensitive e-mail from business associates who use other services and ISPs (an area that's been the source of many problems for AOL subscribers).
- You don't need out-of-town access to e-mail or the Web.
- You don't share your account with other associates, friends, or family members (particularly young children) who have markedly different access needs.
- You aren't tied in to a particular AOL community.

ter account holder must designate mail preferences individually for each screen name on your account.

Use flash sessions. Flash sessions (keyword: flash sessions) make retrieving mail and downloading files quick and easy, and can reduce your online time considerably. Schedule flash sessions at whatever frequency you choose—say, once a day (at an off-peak time, for example) or every couple of hours. During a session you can choose to send all outgoing mail, retrieve mail, download specified files, or send and receive newsgroup messages. Once the specified task is completed, AOL logs off automatically.

IT ISN'T PERFECT, BUT...

WILL INSTITUTING FLASH sessions and taking advantage of mail and marketing preferences mean that using AOL will be fast and trouble-free? Of course not. But these steps will go a long way toward making your online time more productive and far less frustrating.

Do you have a tip for making AOL more tolerable? Have you given up on the service altogether? Share your experiences by sending an e-mail to consumerwatch@pcworld.com. Roberta Furger is a PC World *contributing editor. Her first book,* Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution, *is available from Warner Books.* ■

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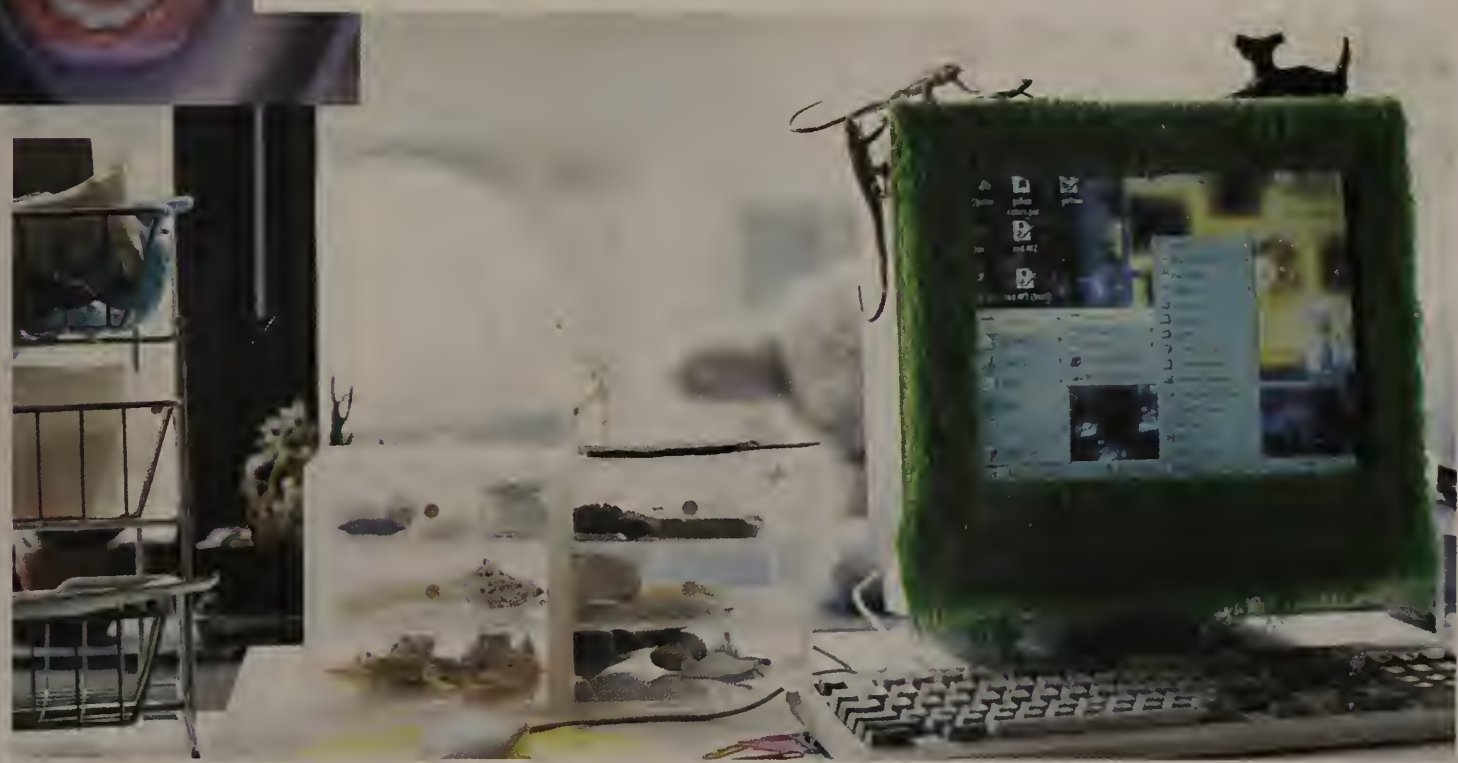

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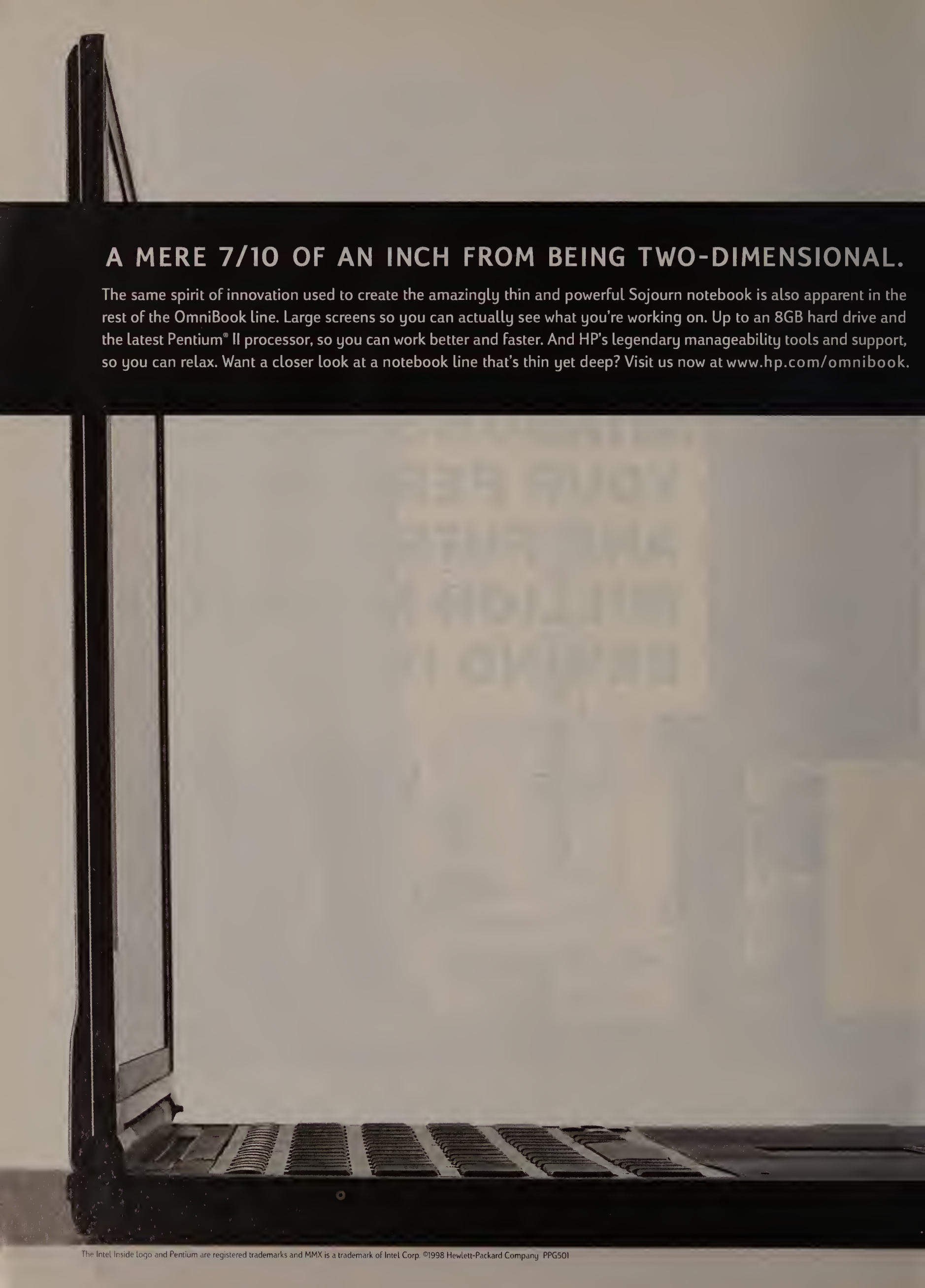

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Customer at War With Maximus

IF YOU'VE EVER thought about buying a bargain PC because you don't feel the need for customer support, first read this tale of woe. Jill Henry of New Orleans had problems with her new Maximus system from the day it arrived. First the computer wouldn't boot, so Maximus had her reconnect the cable between the hard drive and the motherboard. Second, the system did not have the promised WordPerfect Suite 8 preinstalled. Then, when Henry complained that the system didn't have the Universal Serial Bus ports she had paid for, Maximus insisted that she install them herself. Maximus would not let Henry return the computer for a refund without charging a restocking fee. And when Henry decided to return the PC for an exchange, Maximus sent the original system back to her—*twice*.

After *PCW Advocate* contacted Maximus, the company apologized to Henry and it offered to replace her PC and pay shipping both ways. However, as a result of Maximus's "unsatisfactory rating" on record at the Better Business Bureau in Irwindale, California (where Maximus is located), and our own tech support phone calls, *PC World* pulled Maximus systems from our Top 20 charts in the May and June 1998 issues.

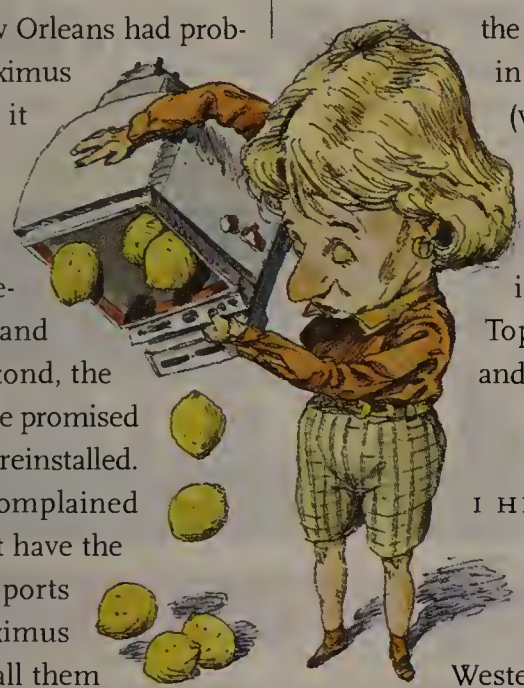


ILLUSTRATION: JOHN CUNEO

I'M SORRY, DAVE

I HEARD FROM a number of readers who experienced terrible service from hard drive maker Western Digital. These readers also reported that bad service from this company is unusual. A company representative admits things got out of control in late 1997 after Western Digital installed a new computer system. When customers called for service or Return Merchandise Authorization numbers, the computer destroyed the information, leaving Western Digital no record of the call. Things are apparently sorted out with the rogue computer (remember Hal?). But if you've been waiting for some action from the company, try again: 800/832-4778.

YOUR MONEY IS NO GOOD

TIRED OF ALL these gripes? Well, check out this story from Tracy Gowens of Dalton, Georgia: "We have a Hewlett-Packard DesignJet 755CM plotter that went on the blink. I called HP for service and found it was too expensive (over $1000) to have them come out and fix it. They recommended an HP authorized repair facility in Atlanta. That repair center charged us only $550 but was unable to fix the problem completely. This February we decided to pay HP's prices and get the thing fixed once and for all. I called and HP sent out a repair specialist two days later. This guy worked on the plotter for 3 hours and replaced part of the carriage—at no cost! I would have paid for full service; I would have been overjoyed to have a $550 discount applied to the fee. But HP's policy is 'pay once, satisfaction guaranteed', even if HP didn't do it to start with."

THE BODY COUNT

DirectWave, a direct-mail computer manufacturer in Orange, California, has filed for Chapter 7 bankruptcy. If you have claims against the company, call DirectWave's trustee, Thomas Casey of Marshack and Shulman, at 714/540-5400.

Hard drive maker **Micropolis,** based in Chatsworth, California, filed for Chapter 11 bankruptcy last November. Customers who need warranty repairs should visit www.st.com.sg/mic3.htm.

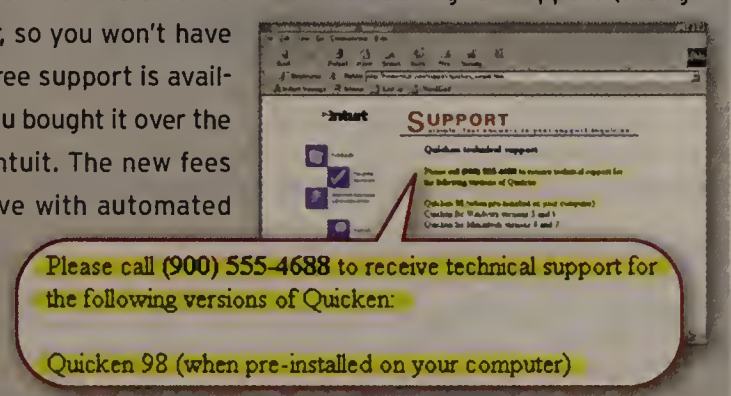
Logicode Technology, a modem maker in Camarillo, California, closed shop in February. If you need technical support or warranty service, call 818/678-1850 or visit www.logicode.com.

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for* PC World. ■

THE FINE PRINT

QUICKEN SUPPORT: SOMETIMES FREE, SOMETIMES NOT

DO YOU NEED live technical support for Intuit's Quicken? Well, you may have to pay for it, according to the company's Web site (www.intuit.com). Owners of Quicken 5 or 6 will be charged $1.95 a minute on a 900 line when calling for support (though Intuit does guarantee the answer, so you won't have to pay again if it doesn't work). Free support is available, however, for Quicken 98 if you bought it over the retail counter or directly from Intuit. The new fees started in January. If you can live with automated voice response, Web page support, or fax-back services, all of those help options have been expanded and are still free.



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TEXAS INSTRUMENTS

Torn Between Two Web Browsers

For consultant Dorinda Sears, changing from Navigator to Internet Explorer was a no-brainer—or so she thought.

PHOTOGRAPH BARBARA RES

PROBLEM *Differences between the two major Web browsers can make converting from one to the other a challenge.*

SOLUTION *Download conversion tools to ease the transition—but be prepared to take several steps.*

EVERY TWO YEARS, Dorinda Sears gets a new PC for her work as a senior search consultant for Caywood Partners, an executive search firm in Tiburon, California. A few months ago, she received a Gateway system with Internet Explorer 4.0 preinstalled. Says Sears, who had used Netscape Navigator up to that point, "Since it was there in my face, I thought I'd try it."

Sears eventually decided to stick with IE 4.0, but she found no straightforward way to convert her Navigator bookmarks into IE favorites (Microsoft's name for bookmarks). So she asked an administrative assistant to open Navigator on her old PC and cut and paste the bookmarked URLs into a Eudora e-mail message. Because Eudora supports active hyperlinks, clicking on a URL in the body of the e-mail message automatically opened the appropriate Web site in IE 4.0 on her new PC. Once the site was loaded, Sears added it to her IE Favorites menu. Then she repeated the process until she'd transformed all her bookmarks into favorites.

What a chore. If like Sears you're switching browsers, you'll want to take your plug-ins and e-mail information with you. It's not easy being caught between fierce competitors like Microsoft and Netscape, but some tricks and tools can help smooth the conversion.

BOOKMARKS AND FAVORITES

NOW THAT NAVIGATOR and Internet Explorer are both free, many Web surfers will be tempted to use them interchangeably. According to Mike Williams, a sysop for CompuServe's Netscape User forum, most will encounter the same dilemma Sears did. That's because IE and Navigator have always handled bookmarks differently. Navigator saves bookmarks in a single HTML file, while IE essentially creates separate Windows 95 shortcuts.

Netscape users who want to switch to IE 4.0 have it easiest. During the installation process, IE 4.0 automatically imports any Navigator bookmarks on a PC (earlier versions of IE don't do this). Once translated and placed in a folder called Imported Bookmarks, the Navigator bookmarks are available in IE along with other favorites. Tom Tsao, product manager for Communicator, says Netscape is considering adding the ability to automatically import Internet Explorer favorites to Navigator 5.0.

Aside from automatic conversion during installation, Navigator bookmarks can't be directly imported into IE or vice versa. But there are indirect ways. If you have both browsers installed on your system, you can open the Netscape bookmark file in IE 3.*x* or 4.*x*. To do this, select *File•Open•Browse;* choose the hard drive where your application files are stored; and navigate through the following folders: Program Files, Netscape, User, and Your Name. You'll find the Netscape bookmark file (in ▶

HTML format) in the Defaults folder. IE displays this file as a page, with all the bookmarks available as active links. Clicking on any link opens the site in IE, at which point you can save it as a favorite.

Unfortunately, IE favorites aren't in HTML, so you can't switch them to Navigator this way. Your best bet is to use one of several freeware and shareware utilities to convert favorites into bookmarks. One of the most popular is NavEx, a freeware conversion tool available for downloading at PC World Online. Or you can try Bookmark Converter 2.0, an $8 shareware utility. These utilities also work in reverse—converting bookmarks into favorites.

PLUG-INS AND E-MAIL

BOOKMARKS AREN'T THE only things you'll want to take along if you change Web browsers. How about all your plug-ins and e-mail settings?

When it comes to browser plug-ins, IE 4.0 automatically looks during installation to see if any are on your system (in Netscape folders). If so, Microsoft's browser uses the Netscape plug-ins, so you don't have to install them manually.

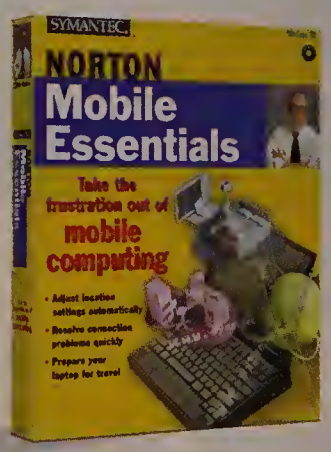
Netscape's browser doesn't support ActiveX controls, nor will current versions of Navigator import other IE plug-ins. According to Tsao, Netscape is considering adding that ability in the next version; but for now, users switching to Navigator must install the plug-ins they need.

Converting e-mail messages, address books, and e-mail settings (such as your address and your ISP's phone number) from Navigator to IE takes only a few steps. Open Microsoft Outlook Express, the program IE uses to send and receive messages. Select *File•Import;* choose Address Book, Messages, or Mail Account Settings; and in the pop-up window, select the files you want to import.

Because Microsoft uses a proprietary mail format, relocating e-mail messages, addresses, and settings to Communicator requires a few more steps. The easiest work-around, Tsao says, is to export your IE 4.0 messages from Outlook into Eudora format using a converter tool (available at PC World Online). Once your messages are in Eudora format, you can import them into Navigator, following the directions given at Netscape's help site (help.netscape.com/kb/client/970709-1.html). As for addresses, you'll need another utility, such as Interguru's E-mail Address Conversions, a $20 shareware program.

When all the heavy moving is done, take a breather. And while you're resting after the browser transition, check out "You've Got E-Mail" on page 135 for more on handling e-mail and address books.

online *You can find files from this article at www.fileworld.com. Having trouble resolving a PC-related hardware or software problem? Tell us about it. See page 14 for contact information. James A. Martin is a* PC World *contributing editor.* ■



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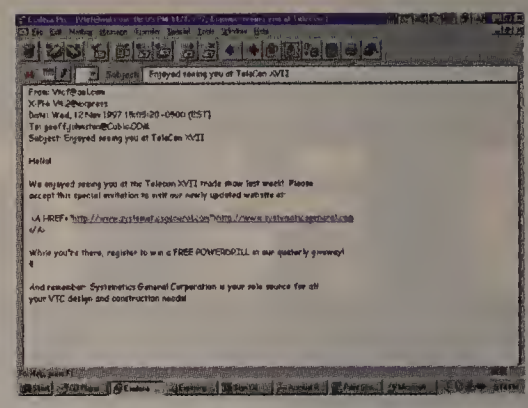

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Communicator 4.05 ◆ Windows meets year 2000 bug ◆ NT 4.0 Service Pack 4 and more

Netscape: The One After 4.04

IT'S BEEN SO LONG since Netscape updated its Communicator Internet suite (several months!), it was starting to look like they'd finally broken the dot-release addiction. But no.

BUGS Habitual browser downloaders antsy for a fix can jump on version 4.05 and its comforting dose of security patches and bug fixes. The most important patch closes the Preferences security hole. That flaw allows malicious Web site operators to read your prefs.js file, which contains sensitive information such as your mail account name and password. As with browser security holes, this one is mostly theoretical—an unethical hacker could use the information to read your mail or masquerade as you, but so far, no such attack has been reported. Netscape says Communicator 4.05 also speeds up Java performance; includes a new utility for importing folders, messages, address books, and settings from Eudora; and bundles an updated AOL Instant Messenger client that closes a security hole reported last month.

FIXES To update your browser, launch Communicator and choose *Help•Software Updates*. You can also download one of the four different product configurations (Basic, Complete, Professional, or Navigator Standalone) from Netscape's FTP server at ftp.netscape.com/pub/communicator/4.05/shipping/english/windows/windows95_or_nt/. For more details on the improvements in Communicator 4.05 (including unresolved issues), see home.netscape.com/eng/mozilla/4.0/relnotes/windows-4.0.html#Whats New.

Meanwhile, Microsoft has posted another security fix to its Internet Explorer 4.0 and 4.01 browsers. Like earlier buffer-overrun security holes reported here, the "embed" flaw could allow unscrupulous Web page authors to crash your system or execute programs on your machine. Find details and a patch at www.microsoft.com/ie/security/?/ie/security/embed.htm.

WINDOWS 95 MORE READY FOR 2000

FOR THE MOST PART, PC users have little to fear on January 1, 2000. That doesn't mean the transition will go without a hitch, though. If you use Windows 95's Date command at the DOS prompt to change your system date, Windows will squawk at you unless you type in all four digits (in other words, it likes 2000 but balks at 00) for the years 2000 to 2079. A 258KB update at support.microsoft.com/download/support/mslfiles/win95y2k.exe updates the command, and adds a new switch to the Dir command that forces it to display file dates using four digits instead of two. The patch also includes an updated version of the 16-bit File Manager utility; the version included on the Windows 95 CD couldn't handle file dates after 1999 correctly.

Windows NT 4.0 has its own trouble with the year 2000. If you happen to set a user's account to expire on February 29, 2000, the User Manager utility dutifully, and incorrectly, informs you that 2000 is not a leap year. The problem is resolved in the forthcoming Service Pack 4 (see below).

Files from this article are available on PC World Online at www.fileworld.com. Scott Spanbauer is a senior associate editor for PC World. ■

IN BRIEF

Nuts and Bolts 1.04

HELIX SOFTWARE hasn't stopped perfecting its flagship utility. The 2.7MB update (ftp.helixsoftware.com/pub/techsupp/n&b/updates/domestic/nb104w95.exe) also contains a new unformat tool.

RegClean 4.1a

MICROSOFT YANKED ITS free Registry-cleaning utility for improvements, but the 781KB tool is now back at support.microsoft.com/download/support/mslfiles/RegClean.exe.

IE 4.0 PowerToys Redux

LIKE REGCLEAN, Microsoft's free IE 4.0 PowerToys (browser add-on utilities) needed work. A debugged 235KB version of the tool set has reappeared at www.microsoft.com/ie/ie40/powertoys/.

Windows NT 4.0 Service Pack 4

EVEN THOUGH SERVICE PACK 3 solved most of Windows NT 4.0's biggest problems, NT's security as a Web server or firewall opens it to increasing scrutiny from the Internet community, which continues to reveal additional loopholes and flaws. Despite earlier denials, Microsoft now says it is preparing a Service Pack 4, which will contain dozens of security fixes and a new centralized domain security configuration editor.

Service Pack 4 was still undergoing beta testing at press time. If Microsoft posts SP4 using the same naming and directory conventions as with previous service packs, the final Intel-based U.S. version will probably be posted at ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/nt40/ussp4/i386/nt4sp4_i.exe.

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STORY #158:

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Microsoft Office: Construction in Progress

PREVIEW

IN TODAY'S fast-moving PC industry, an office suite that goes two years without remodeling seems like a candidate for the National Registry of Historic Software. Take Microsoft Office 97: It hit store shelves in early 1997, but it won't be upgraded until late this year or early in 1999. In that stretch of time, both Lotus and Corel will have released two major upgrades to their suites. To be sure, Office is no relic just yet: It's still a strong product and a *PC World* Best Buy. But plans for the next version are emerging.

From technology demonstrations at the company's headquarters and interviews with Microsoft executives, here's what we know so far. The new version will likely focus on some of the same areas as the next offerings from Lotus and Corel, so look for beefed-up Web capabilities and refinements aimed at making existing features easier to use. Microsoft demonstrated some new collaboration tools, including one for group discussions within Office files. For the most part, the new Office will still use the same file types as Office 97, but it will add a new set of HTML-based formats (see "File Format Frustrations: New Clouds on the Horizon").

Like Office 97, the coming upgrade will probably be sold in several slightly different forms. Pricing remains up in the air, and while the formal version number is 9, the exact product name has yet to be determined. We looked at a work in progress: Features discussed here could evolve or disappear before the product ships, and details about specific changes to Word, Excel, and the other applications remain spotty. Still, the new Office shows signs of promise.

HOT WEB MOVES

FOREMOST AMONG Microsoft's plans for the new Office: allowing typical users to create content more easily for Internet or corporate intranet Web sites. The company concedes that Office 97's existing Web features are too complex for most users. "We got part of the way there, but we have a long way to go," admits Matthew Price, a group product manager in Microsoft's desktop applications division.

With Office 9, you'll still create and publish Web content from within Word, Excel, and other applications. In contrast, Lotus's upcoming SmartSuite Millennium Edition adds a stand-alone Web authoring application called FastSite. But Microsoft intends to deliver a new way of saving documents in HTML for use on the Web.

In current suites, preparing documents in HTML tends to be a one-way exporting ▶

More practical than radical, the next upgrade of Office promises greater Web integration and collaboration features, plus interface tweaks that should make it easier to use.

◆ BY HARRY McCRACKEN

3-D ILLUSTRATION: BUD PEEN; PHOTOGRAPH: KEN SMITH

JUST IN

High-Speed Net Service Rollouts

IN JUNE, GTE will offer Digital Subscriber Line, a high-speed Internet access service, to some of its customers. Pending approval from the FCC, GTE will provide DSL in areas of Oregon, Washington, North Carolina, and Indiana. In the second half of this year, GTE plans to sell the service in at least 30 more markets around the country. Its DSL offerings will range from a $60-per-month Internet service that downloads data at 256 kilobits-per-second to a $150-per-month version that can download at 1.5 megabits per second. GTE will sell the DSL modems for about $300 or rent them out at $12 per month. In a related announcement, America Online said it would begin limited trials of a $49.95-per-month DSL service. AOL did not specify the service's speed or future rollout plans.

40X CD-ROM Drive

KENWOOD TECHNOLOGIES will ship a 40X CD-ROM drive this summer that uses a new technology to transfer data about twice as fast as a 32X drive, the vendor claims. The drive's TrueX technology, developed by Zen Research, lets the device read multiple tracks off a disc at one time. The 40X unit's price ▶

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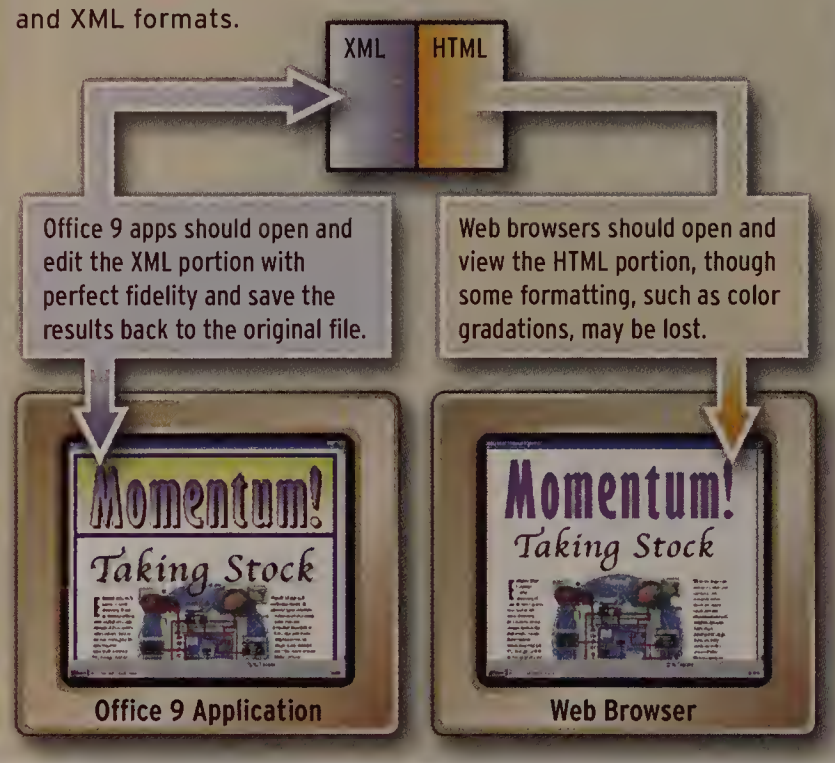
process that doesn't retain all of a document's original formatting. But with Office 9, Microsoft plans to employ a still-emerging Web standard called XML to let you create files containing two separate versions of a document: one in standard HTML format for use in Web browsers, and the other in XML that retains the same rich, editable formatting as Office's native file formats.

If Microsoft pulls this off, here's what will happen: When you open one of these hybrid files in a Web browser, you'll see the HTML version of the document, which may not capture complex formatting perfectly. (Microsoft says it should improve on Office 97's results, however.) But when you open the same file in Office, the XML version will load, and you'll be able to view it with absolute fidelity, make changes, and resave the file without ever having to use the suite's native file format. The HTML-XML files will probably be large and slow to load; and some elements, such as graphics, will be stored separately. For these reasons, they won't entirely replace Microsoft's native formats.

Two Files in One

When an Office 9 Web file is saved, it will contain both HTML and XML formats.



Saving HTML files to a Web server with Office 97 isn't very intuitive; Microsoft says most users rely on a savvy Webmaster to post files. To make the job easier in Office 9, the company plans to rework the old suite's File Open and Save dialog boxes. In the demonstration we saw, the current drop-down drive list was replaced with a larger, scrolling window of icons that represented local and networked drives, Web servers, and other locations where files can be stored.

WORKING TOGETHER, MICROSOFT STYLE

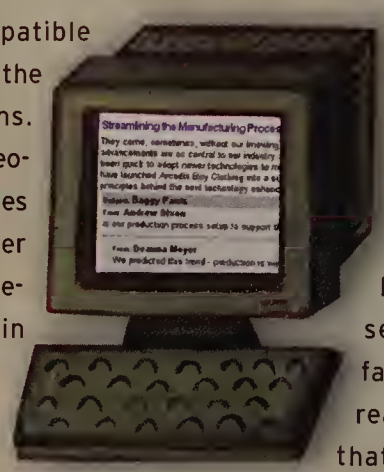
IN THE PAST, Lotus's SmartSuite has blazed most of the new trails in workgroup tools. But Microsoft plans to give Office 9 several innovative Web-based features to help groups of users share information and collaborate on documents. Some of these tools will require a company to install software on its server.

For instance, the company showed us a feature (accessible to users working within the suite or in Web browsers) that would let documents contain Internet newsgroup–like discussions. The tool was still in a rough state, but it could be very handy for colleagues

ILLUSTRATION: BUD PEEN

File Format Frustrations: New Clouds on the Horizon

"OUCH!" That's Microsoft product manager Matthew Price's blunt summary of how Office users reacted when Office 97 introduced new, incompatible file types for all of the suite's applications. Sharing files with people using other suites or those using earlier versions of Office became an exercise in frustration.



DEJA VU?

WITH TIME, the situation improved. Microsoft eventually released an update that provided better backward compatibility with Office 95. And Corel and Lotus put a lot of effort into ensuring that their suites could read and write Office 97 file formats with reasonable fidelity.

But with a new version of Office in the works, will ugly file-format history repeat itself—this time as farce? The mostly reassuring news is that, except in the Access database, Microsoft plans to retain the Office 97 formats as the forthcoming Office 9's native file types. As a result, Office 9 users shouldn't experience too much of a hassle sharing the two most crucial types of files—Word and Excel documents—with users of Office 97, SmartSuite, and WordPerfect Suite.

UNANSWERED QUESTIONS

HOWEVER, Microsoft's plans for a new HTML-XML hybrid file format raises a different set of compatibility questions. XML is an open standard that both Lotus and Corel plan to support in their next releases, and it could eventually supply the basis for universal file formats usable by all suites.

At press time, details on how Office 9 will use XML were still sketchy. "Microsoft has been extremely vague in describing exactly what it is going to do," says Tim Bray, an independent Internet consultant and coauthor of the XML 1.0 specification. The company may use what Jeffrey Tarter, editor and publisher of the *Softletter* industry newsletter, describes as "a gazillion proprietary tags" to re-create its file formats in XML. If so, Lotus and Corel will probably need to release updates that explicitly support Microsoft's tags, something that Lotus has already committed to doing. In the short term, though, sharing these files could be a painful experience. —H. M.

who need to do team editing on a document and throw ideas back and forth.

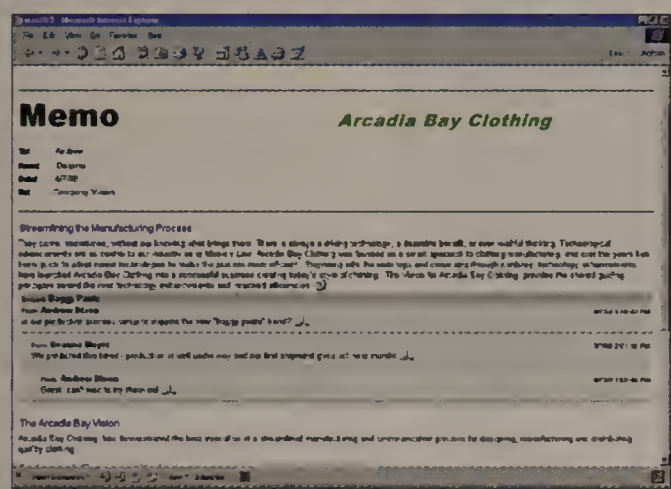
Another proposed addition, dubbed "Office Web Components," would allow users to publish Excel and Access data in a format viewable and editable with a Web browser. One component, for example, would permit you to capture an Excel data range as a small table and corresponding chart and distribute this data via e-mail or a server. Subsequently, Internet Explorer users would be able to manipulate and edit the table and chart. The current plan is to base these components in part on Microsoft's ActiveX technology; Netscape Navigator users would be able to view them, but they might not be able to edit them.

One more catch: Only licensed Office 9 users will have full access to all the suite's components. Microsoft says they will serve as a quick way to pinpoint vital nuggets of information within big documents—say, current sales figures from a spreadsheet of your company's complete financials.

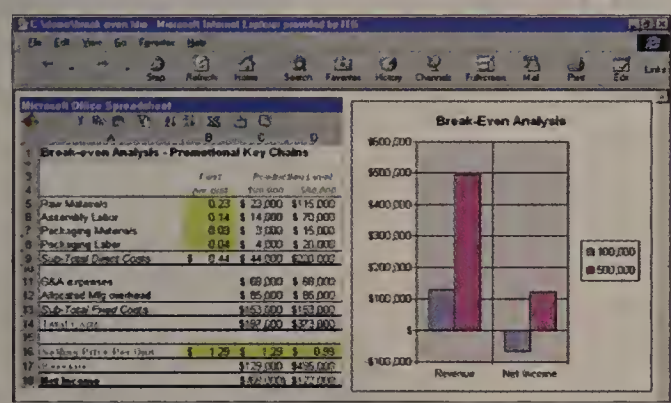
BACK TO BASICS

BEYOND THE NEW Web and collaborative tools, Microsoft, like its main competitors, may concentrate on improving its suite's existing features, rather than introducing a whole raft of dramatic new elements. (For more about Lotus's plans, see "New Lotus SmartSuite Millennium—Practical, Not Pioneering," May 1998.)

Don't expect a wholesale revamping of Office 97's look and feel. Microsoft is generally happy with the suite's menus, toolbars, and dialog boxes. The changes will focus on giving the suite an interface flexible enough to meet the needs of a wide range of users.



A NEW DISCUSSION FEATURE (shown in prototype) will let coworkers exchange messages within Office 9 files.



EXCEL AND ACCESS USERS will be able to publish data for viewing and editing within a Web browser.

For instance, Office 9 may add a menu system to help users find the features they need. If it does, when you pull down any of the suite's menus you'll first see only a short list of essential commands. But if you hover the mouse pointer over the menu for a moment, more choices will appear, and choosing one will add it to the basic menu thenceforth.

Look for additional examples of IntelliSense—Microsoft's term for features that monitor your input on the fly and react accordingly. In Office 97, IntelliSense seems most prominent in Word, where it transforms Web addresses into hyperlinks, checks your spelling and your grammar as you type, and asks if you need help preparing a letter when you type a salutation such as "Dear Larry." In Office 9, Microsoft promises, other applications will gain similar features; as before, much of the assistance will be provided via the controversial Office Assistant cartoon characters. (Microsoft plans to make disabling this automation easier in Office 9 than in Office 97.)

Microsoft is also working on a smarter setup utility that will notice if you have installed but never used, say, Excel 97's equation editor. In a case like this, it will conserve disk space by omitting the feature from Office 9. If you need to call on an omitted feature at some later point, the suite will add it on the fly, from either a server or the CD-ROM.

HOLD THE JAVA

THE BIG SUITES look and work more alike than ever these days, but some basic philosophical differences remain. Both Lotus and Corel are betting big on the Java programming language, while Microsoft continues to steer clear of the technology. It has no plans to use Java to im- ▶

had not been set at press time, but TrueX drives are expected to sell for about $100 more than standard CD-ROM drives. The technology could be incorporated into DVD-ROM drives by next year, according to Zen Research CEO Emil Jachmann.

Better Multimedia?

MICROSOFT demonstrated a new software technology for Windows 98 and NT 5.0—code-named Chrome—that's intended to improve performance of 3-D animation, audio, and other multimedia capabilities. This new set of commands for Windows would let a PC download and display Chrome-enhanced 3D Web pages faster. Developers could also add the technology to multimedia business applications and entertainment titles. Still, Chrome may not appear until 1999. And it will require a high-end PC, sporting at least a 350-MHz Pentium II and an Accelerated Graphics Port video card.

Tidbytes

Cheap Speech: Dragon Systems' new $60 Dragon Point & Speak will let you dictate text into word processing or e-mail applications. It relies on the same continuous speech engine that the company's more expensive NaturallySpeaking product uses. **Low-Priced Color Laser for Workgroups:** The QMS $2499 Magicolor 2 DeskLaser Printer is a networkable 600-dpi color laser printer that includes 8MB of RAM and has rated print speeds of 4 ppm in color and 16 ppm in black and white.

SUITE NEW TOOLS

Office 9: What's in the Works

FEATURES	Details
Web site authoring	HTML files that can be reopened in Office apps and edited without loss of formatting; easier posting to Web sites.
Collaborative tools	Publishing of Excel and Access data for use in Web browsers; threaded discussions in documents; document management features.
User interface	Menus that adjust themselves to add user's favorite tools; more IntelliSense automation and help throughout the suite.
Installation and maintenance	Smarter updating of existing installations; on-the-fly addition of new features.

prove the rendering of suite documents in Web browsers, something that WordPerfect Suite already does and SmartSuite soon will do. And unlike Lotus and Corel, the company will not release a Java suite aimed at users of Network Computers. Instead, it will strive to make Office 9 run well on Windows-Based Terminals—terminal-like devices that compete with NCs.

Microsoft is also eschewing speech recognition, another of the new-wave technologies that the other suites are putting in. IBM's ViaVoice is already part of SmartSuite; and at press time, Corel was preparing to incorporate NaturallySpeaking speech recognition software (from Dragon Systems) into its WordPerfect Suite. Though Microsoft has a keen technological and commercial interest in voice input—it owns a fair chunk of speech-recognition vendor Lernout and Hauspie—it contends that adding voice input to Office before its accuracy improves dramatically would be a mistake.

UNDER CONSTRUCTION

ONCE MICROSOFT'S remodeling job is complete, will what is now called Office 9 be a wise upgrade for Office 97 users, not to mention folks who still use Office 95 or earlier versions? That remains unclear, but with the new version still months away from release, you needn't be in any rush to decide. At press time, Microsoft planned to distribute a beta version of the suite sometime this summer. Once we've put that model through its paces, we'll report back with an update.

—Harry McCracken

New Affordable Notebooks: Portables for Penny-Pinchers

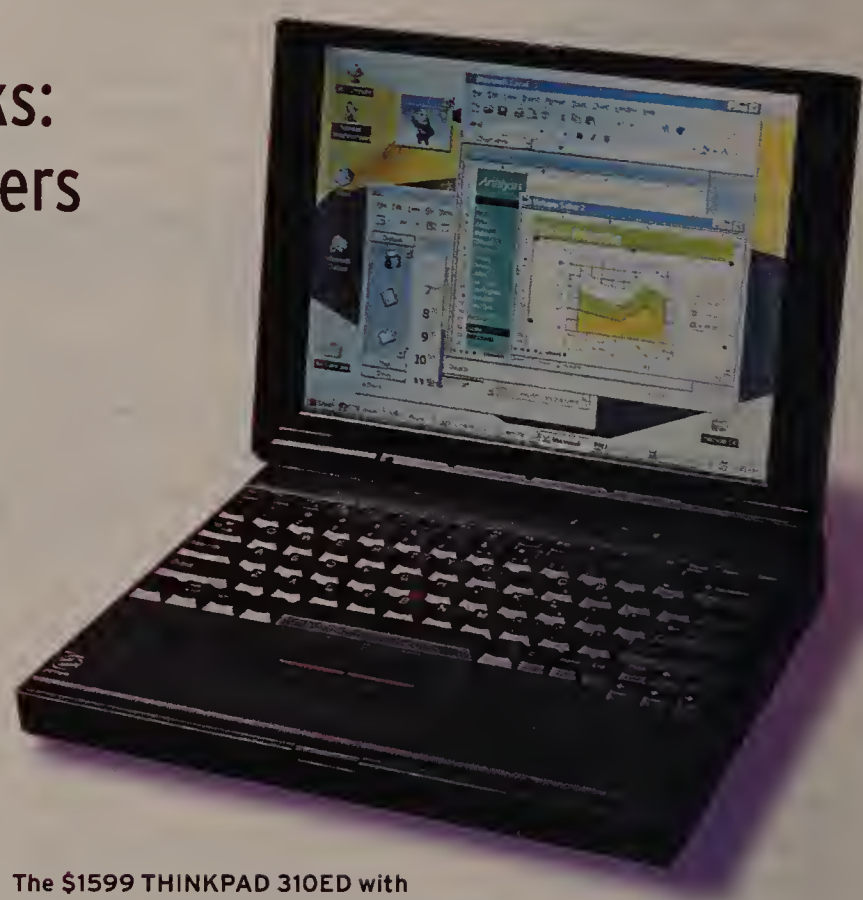
ON THE move and on a budget? If you have only a measly $1500 to spend on a notebook, that doesn't mean you must settle for a clearance-sale model anymore. At least half a dozen vendors—including such prestige shops as IBM, Toshiba, and Hitachi—are introducing brand-new notebooks that are geared specifically for the price-conscious buyer. Don't expect to get the latest processor, the sharpest screen, or the roomiest hard disk. But for general business purposes, these notebooks do the job—for approximately $500 less than what the cheapest freshly minted notebooks from the same vendors were selling for just a few short months ago.

We tested three units from this crop: the IBM ThinkPad 310ED, the Toshiba Satellite 305CDS, and the Hitachi VisionBook Plus 5260. All three cost between about $1500 and $1600 and have similar specifications: mobile Pentium MMX-166 processor, 12.1-inch dual-scan LCD screen, 256KB secondary cache, 2.1GB hard disk, internal CD-ROM drive, and 56-kbps modem (either built in or on a card).

PRICE/SPEED TRADE-OFFS

PERFORMANCE honors, not surprisingly, went to the one notebook that came standard with 32MB of RAM: the IBM ThinkPad 310ED. But take note: These notebooks' cheaper screens, hard disks, and graphics controllers make them significantly slower than pricier models—even those that carry the same 166-MHz processor and 256KB external cache. The good news is that dual-scan technology has improved, making these notebooks' displays attractive and bright, if lacking the razor sharpness and wide viewing angle of active-matrix screens.

Besides being fastest, the ThinkPad benefits from its legacy of fine construction. To many, ThinkPad keyboards have the best layout and feel—the eraserhead pointing stick



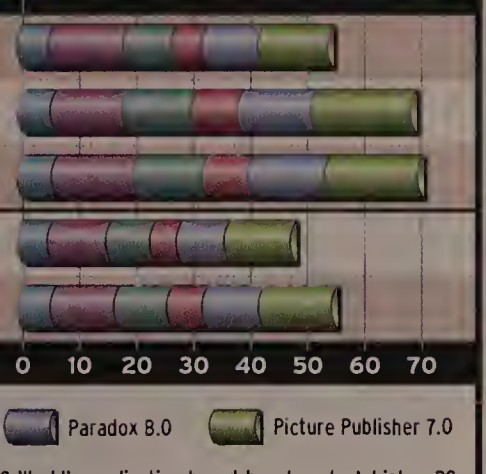
The $1599 THINKPAD 310ED with 32MB of RAM outperformed its competition.

PHOTOGRAPH: STAN MUSILEK

New Notebooks Trade Speed for Price

SYSTEMS	CPU	RAM (MB)	PC WorldBench 98 score
IBM ThinkPad 310ED	Pentium MMX-166	32	82
Hitachi VisionBook Plus 5260	Pentium MMX-166	16	63
Toshiba Satellite 305CDS	Pentium MMX-166	16	62
Average of 3 systems	Pentium MMX-166	32	91
Quantex H-1210	Pentium MMX-166	16	78

All systems have 256KB secondary cache.



TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench 98 score is better. Application scores are in seconds; lower scores are better. The Quantex H-1210 is included for comparison. For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). Data based on testing conducted by the PC World Test Center. All rights reserved.

beats a touchpad any day. This notebook also has the best application software bundle—it comes with Lotus SmartSuite 98. And the ThinkPad has the smallest chassis, in part because the floppy drive is external only; the note's built-in, 12X–20X CD-ROM drive cannot be swapped with any other component.

A FEW EXTRAS

THIS THINKPAD does trade a few features for its attractive price. It lacks an infrared port, for example, and the 800-by-600 display tops out at 16-bit rather than 24-bit color. Strap this baby on for travel, and its nearly 8-pound heft won't let you forget it's on your shoulder. But a mere $1599 for a ThinkPad? Many devotees of this usually pricey line will love the 310E.

By comparison, the $1499 price for the Toshiba Satellite 305CDS buys you only 16MB, rather than 32MB, of RAM. Look closer, though, and you'll discover that the machine packs some nice extras for the price: a combination floppy-and-CD-ROM drive; a lithium ion battery (the others come with nickel-metal hydride batteries); Universal Serial Bus and infrared ports; and good-quality sound.

> **Sub-$1000** notebooks, running Windows CE and **dumbed-down** versions of popular apps, should appear **later this year.**

Best of all, the Toshiba has the nicest of the dual-scan LCDs, with 2MB of video RAM to support full, 24-bit color at 800 by 600. You also get a fine Toshiba keyboard and an eraserhead pointing stick. Applications include a fistful of lesser Microsoft software: Works 4.5, Money 98, Outlook 97, and Encarta 98. The whole package rolls up into a traveling weight of just over 7 pounds, the lightest of the three machines we tested.

The $1599 Hitachi VisionBook Plus 5260 represents another nice option. Its performance was on a par with the Toshiba, and it was the only notebook we tested to include a modular bay, which you can use to swap in the floppy or the 10X–20X CD-ROM drive. You also get both USB and infrared ports.

Hitachi touts its new High-Performance Addressing dual-scan technology, but most people will find the Toshiba's screen brighter and more appealing. They may also prefer a pointing stick to the Hitachi's touchpad—and a traveling weight less than its beefy 8 pounds. Hitachi was the only vendor to opt for no applications, bundling a few system utilities instead.

CHEAP, BUT CHEAP ENOUGH?

IF $1500 TO $1700 is your sweet spot, and you're okay with a dual-scan screen and performance that is roughly 20 percent slower than notebooks costing a few hundred bucks more, we recommend taking a close look at the IBM—or finding the extra $100 needed to bring the Toshiba up to 32MB of RAM.

Other new budget notebook choices—which we haven't tested—include WinBook's $1499 PMMX-200–based XL 200 Dual-Scan and its $1199 AMD K6-233–based XL 233 Dual-Scan. Acer's Extensa 366D delivers a PMMX-166 and 32MB RAM for $1299. But at that price, you can find one of last year's Pentium-133 active-matrix notebooks, if you're not picky about performance. Or you can go even cheaper and buy a remaindered, dual-scan Pentium-133 like the $999 Compaq Armada 4131T—if you can still find one in stores.

Brand-new notebooks, unlike their desktop counterparts, have yet to dip below the magic $1000 mark. That situation should change later this year, when the first Windows CE notebooks are expected to appear. If you can get along with dumbed-down versions of Word, Excel, Mail, Internet Explorer, and PowerPoint, a CE notebook may be worth the wait. It will certainly be worth the money.

—*Yardena Arar*

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ThinkPad 310ED
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READER SERVICE NO. 757

VisionBook Plus 5260
$1599; Hitachi; 800/555-6820; www.hitachi.com
READER SERVICE NO. 758

First V.90 Modems: Good News and Bad

CONSUMER ALERT

FOR MODEM BUYERS, the phrase "new standard" is supposed to conjure up images of easy connections, high performance, and smooth sailing on the Internet. More typically, though, new standards introduce compatibility headaches, waste time, and bring a deluge of configuration problems. After testing the first units to sport the new V.90 standard for 56-kilobits-per-second modems, I suggest that you brace yourself for some rough waters ahead.

A BAD HISTORY

SHOPPING FOR a 56-kbps modem has never been easy. Last year, modem manufacturers flooded the market with devices that supported one of two incompatible 56-kbps technologies: x2 and K56flex. This meant that if you happened to have an x2 modem and your local Internet service provider supported only K56flex, your modem performed like an old 33.6-kbps device.

In February 1998, after considerable industry infighting, vendors agreed on V.90 as a 56-kbps standard. As we went to press, vendors had begun shipping V.90 modems, and when you read this, they will be posting V.90 software upgrades for existing modems. However, ISPs will likely take until midsummer to complete the V.90 upgrade; until then, users will have to deal with the 56-kbps compatibility glitches.

The good news is that V.90 works. To test compatibility, I used three new V.90 modems to dial directly into a V.90 server. I connected at top speeds without a hitch. I also upgraded a modem based on older x2 56-kbps technology to V.90 and experienced no compatibility problems.

The new modems are rather modestly priced. And vendors appear to be keeping their promises, offering V.90 upgrades of their existing 56-kbps modems for free.

> The good news: **V.90 works,** the modems are modestly priced, and the **upgrades are free.**

56K CONCERNS

ONLY NETCOM and some regional ISPs are likely to have established V.90 connections by the time you read this. Others providing 56-kbps service will continue to use hardware that supports only x2 or K56flex. Moreover, all new V.90 modems will support either x2 or K56flex, but not both. So if you opt for a V.90 modem and your ISP hasn't upgraded to V.90 hardware, you'll still have to choose a modem that supports the ISP's current x2 or K56flex hardware.

The upgrade process is another concern. Downloading the V.90 code off the Web and uploading it into a modem is clumsy and tedious. And—surprise—even if you do buy a new V.90 modem, you'll still need to upgrade the flash ROM at some point as vendors fix bugs and optimize their V.90 code for better performance.

Finally, until your ISP upgrades to V.90, you may need to flash your modem back and forth between older 56-kbps protocols and V.90. Why? Say you have more than one ISP, and one has upgraded to V.90 while the other hasn't. Some modems, particularly inexpensive K56flex-based products, such as Boca Research's 56K Home Office Modem, can't automatically switch between the older 56-kbps protocol and V.90. As a result, you'll have to manually reload the V.90 software into the modem when you change ISPs—or paddle along at 33.6 kbps.

V.90 MODEMS CONNECT

I EVALUATED three new V.90 modems: 3Com's $180 (external) U.S. Robotics 56K Faxmodem, which also supports the x2 standard, and Diamond Multimedia's $100 (internal) Supra Express 56k and Boca Research's $130 (internal) Tidalwave 56K, both of which also support the K56flex standard. With each of these modems, I dialed into a V.90 server at 3Com/U.S. Robotics. (3Com has been a key force behind the x2 protocol.) All of the modems connected via V.90 at speeds above 40 kbps and successfully downloaded test files. The 3Com server was the only V.90 server available at press time. To fully test compatibility, I would want to dial into a server sporting V.90 hardware from a vendor that previously endorsed K56flex. Industry experts say that this scenario should not pose compatibility problems, however.

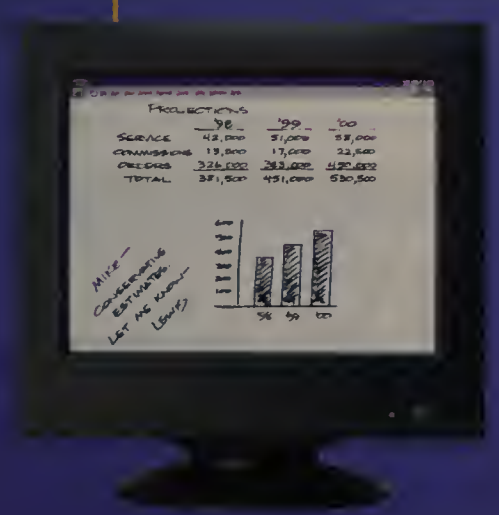
Next, I tested backward compatibility. I used the U.S. Robotics 56K Faxmodem to dial over the Internet into an x2-only server from Netcom. Then I used the Diamond and Boca modems to connect to Erols Internet's K56flex server. In ▶

ILLUSTRATION: TERRY COLON

upload

A notepad that uploads to your PC?

(LOOKS LIKE YOUR NOTES JUST GOT A LOT MORE POWERFUL.)



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MODEMS DECISION GUIDE

Making the Upgrade to V.90: Ifs and Buts to Consider

IF YOU HAVE A...	You need to...	But...
28.8-kbps or slower modem	Buy a V.90 modem if you can't wait.	Be sure it's backward-compatible with your ISP's 56-kbps modems.
33.6-kbps modem	Check with your modem maker for V.90 upgrade deals.	If no deals exist, you may have to buy a new V.90 modem.
56-kbps modem	Obtain your free upgrade.	Wait until your ISP upgrades to V.90.

all cases, I connected via the older protocols at rates faster than 40 kbps, and the modems automatically detected that the server had older 56-kbps technology.

ONEROUS UPGRADES

FLASH-upgrading modems has always been a horror show that required the use of cryptic, poorly designed utilities. With V.90, it appears that vendors like 3Com have made some improvements, but flashing is still a hassle. Here's the basic procedure: You browse your modem maker's Web site for the software upgrade, download the software, and upload (flash) it into your modem.

Many vendors say they will provide utilities to manage the upgrade for you. These programs automatically identify the protocol your modem runs and the upgrade you need to achieve V.90. At press time, only 3Com had posted V.90 flash ROM upgrades on the Web. 3Com also posted two upgrade tools: The Web-based Modem Upgrade Advisor lists existing modems and informs you if and when an upgrade will be available; the Modem Update Wizard software manages the upgrade for you.

When I sought to upgrade an external x2 U.S. Robotics Sportster 56K Faxmodem to V.90, the process went quite smoothly. After locating my product listing in the Upgrade Advisor, I downloaded the Update Wizard software. The Update Wizard is a friendly Windows 95 program that dials into the 3Com server, uploads your modem's model information, downloads the appropriate upgrade, and then flashes the modem with the new firmware. The process was quick and reasonably painless. After upgrading, I was able to connect both to 3Com's V.90 server and to an x2 server.

> When I tried to upgrade the internal modem bundled with my PC, things got ugly.

However, when I tried to upgrade the internal 3Com U.S. Robotics Sportster x2 modem that came preinstalled on my Dell Dimension XPS, things got a little ugly. The Upgrade Advisor utility didn't list my modem. Then 3Com told me that the upgrade info for preinstalled modems had not been posted but would be available by late April.

Additionally, not all 3Com modems can be upgraded via software. For example, if you have an older Sportster 33.6 modem that you upgraded to x2 by obtaining a chip replacement, you may have to send it back to 3Com and get a new board to receive the V.90 upgrade. (These earlier upgrades didn't have the same flash ROM capability that more recent upgrades provided.)

And finally, if you own a 3Com Megahertz XJ1560 or CC1560 PC Card modem card, you should be aware that the original V.90 upgrade software for these modems caused a few products to stop working. The company has removed the upgrade from its Web site and won't restore it until the problem is fixed, according to 3Com vice president Rich Redelfs.

OTHERS' UPGRADES

BY THE TIME YOU read this, Diamond Multimedia and Boca Research should both have posted their upgrades on the Web. Boca Research's upgrade tool includes both K56flex and V.90 and should already be available. Once you download the tool, the protocols reside on your hard drive, enabling you to flash between the protocols without having to download the code from the Web each time. Details on Diamond's upgrade tool were scant at press time, but the company plans to have the upgrade posted to the Web by the time you read this.

PROCEED WITH CARE

IF YOU CAN'T wait until the V.90 transition is completed this summer and are already shopping for a new modem, consider buying a V.90. These products are reasonably priced. The models I examined cost between $100 and $180, which is comparable to what vendors have been charging for their x2 and K56flex 56-kbps modems. Just make sure that the new modem supports the older 56-kbps technology offered by your ISP. And remember that even new modems will have to be flash-upgraded. If you're looking for a bargain and have patience and spare time, you might be able to pick up an old 56-kbps modem for cheap and upgrade it. But if you're happy with your current modem—be it a 56-kbps unit or slower—wait a few months until vendors have ironed out the kinks in their V.90 products.

—Dean Andrews ▶

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A Tax-Free Net Forever? Not So Fast

ANALYSIS

READ THEIR LIPS—no Net taxes, at least not for a few years, if any one of three bills winding their way through Congress becomes law.

NO SPECIAL TARIFFS

THE BILLS—ONE proposed by Rep. Christopher Cox (R-Calif.), another by Sen. Ron Wyden (D-Ore.), and a third by Sens. Judd Gregg (R-N.H.) and Joe Lieberman (D-Conn.)—would all temporarily ban special tariffs on Internet access fees or bandwidth use. But *temporarily* is the key word: This is a moratorium, not a permanent ban. All three bills acknowledge that taxing the Net is inevitable. The question is how.

The three bills differ in their particulars. The Wyden bill calls for a six-year moratorium, twice what the others seek. Each bill calls for a policy body to study the Net tax issue during the moratorium, but they differ on how these bodies should be composed and what their goal should be (see the chart below).

The bills have one important common denominator: None specifically bans sales taxes on Internet transactions. And sales taxes—on all remote sales, including mail-order, catalog, and Internet transactions—are what these bills are ultimately all about.

"Electronic commerce triggered the debate, but it's not about electronic commerce," says Charles McLure, a senior fellow at the Hoover Institution in Palo Alto, California. "If our sales tax [system] made sense, we wouldn't be having this conversation."

> Sales taxes–on all **remote sales,** including mail order, catalog and **Net transactions**–are what these bills are ultimately **all about.**

LOST REVENUE

WHAT DOESN'T make sense is this: As tax laws stand now, if a merchant sells to a customer residing in a state where that merchant has a physical presence, that merchant must collect sales tax—whether the sale occurs across a counter, by mail, or over the Net. In the latter two cases, those taxes are rarely paid, because of the difficulty of tracking remote sales.

The National Governors Association estimates that $4 billion of potential sales tax revenue is lost each year on the $100 billion spent for mail-order purchases. In only a matter of years, Internet commerce could represent an additional revenue loss of as much as $12 billion. Local officials would like to collect sales taxes from nonlocal merchants for sales to residents in their jurisdictions—which is why those officials support the Cox bill and its call for a national system designed to collect taxes on remote sales.

"It is vital that the Internet thrive," says Colorado Gov. Ray Romer. "But it is also vital that states have sales and use taxes that are fair to businesses of all kinds, whether they operate on Main Street, through catalogs, or electronically," he adds.

OLD-FASHIONED HARDBALL

HOW DO VENDORS feel? "The [retail] industry isn't saying, 'We want to be tax exempt'," says Kent Johnson, national partner for KPMG Peat Marwick, which recently surveyed Internet-based businesses on the issue. "Most of them would love to have a clear, equitable, nondiscriminatory system in all the states. Most important, they want the compliance side of it to be very easy."

The Wyden bill has already passed the Senate Commerce Committee and is expected to face a floor vote as early as May; the Gregg/Lieberman bill could be attached as an amendment. And the Cox bill might come up for a House vote even before May.

Almost everyone involved agrees on the need to standardize taxes on Net transactions. But that has become much more difficult now that the issue covers all remote sales. So while the focus is on futuristic commerce, what looms ahead is an old-fashioned game of hardball.

—*Daniel S. Levine* ▶

INTERNET TAX BILLS COMPARISON

What Washington Policy Wonks Have in Store for the Net

	Cox	Gregg/Lieberman	Wyden
Moratorium (years)	three	three	six
Policy study body	Commission: 2 Cabinet officers, 14 state and local reps, 12 members appointed by Congress	Commission: 3 Cabinet officers, 3 governors, 3 local officials, 6 vendors	Consultative group within the administration
Policy study body's goal	Ensure uniform national tax system on all remote sales	Harmonize state and local taxes on Internet transactions	Recommend "appropriate parameters" for taxing Net-related activities
Supporters	National Governors Association	vendors	Department of Commerce

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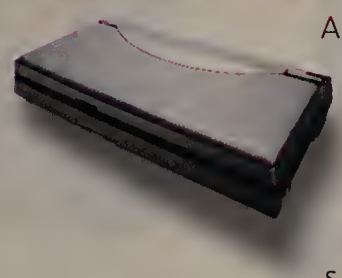

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TV Signals Bring the Web to Your PC—Stay Tuned for Further Developments

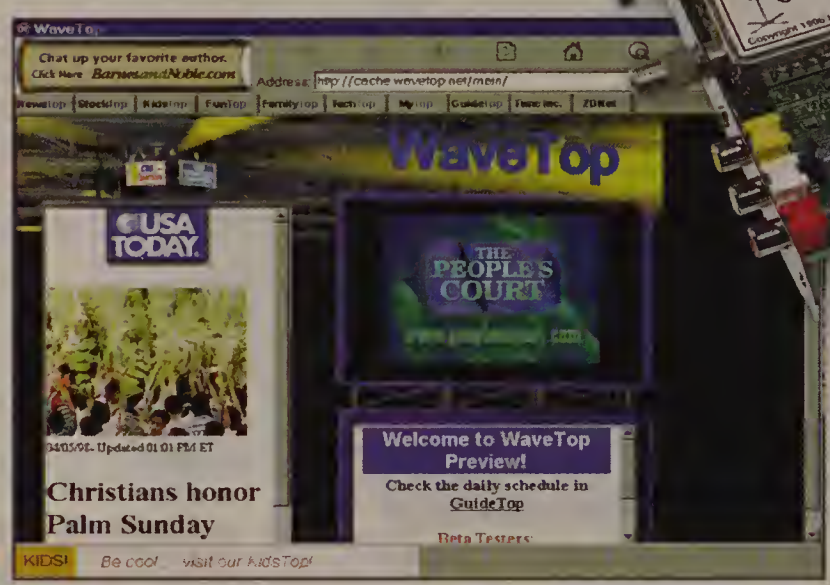
NEED A BREAK from your spreadsheets? Change the channel and catch the latest sports scores. Or switch again and watch your favorite Web pages pop onto the screen as fast as a station on your TV. And you don't need a modem or an Internet service provider.

WEB VIA VBI

THE TECHNOLOGY making all this possible employs a TV tuner card, inserted in your PC, and software to decode Web pages transmitted over an unused portion of the TV signal known as the vertical blanking interval (VBI). WavePhore of Phoenix, Arizona, first developed the technology three years ago, and Intel's free Intercast service has been using it since 1996 to deliver Web content related to shows on such major cable services as CNN, QVC, and MTV.

Now WavePhore is introducing its own free software and service, WaveTop, that works with Microsoft Internet Explorer 4.0 to deliver Web pages from selected major sites, at least 17 hours a day, with updates as often as every 15 minutes. They're stored on your hard drive, so there's no wait to see the front page of *USA Today* or the latest box scores on CBS SportsLine. The software requires a Pentium-90 or better (P-133 recommended) PC with 16MB of RAM, at least 100MB of disk space, and Windows 95.

WaveTop is about to become ubiquitous: Microsoft, hedging its bets on the future of PC/TV convergence, plans to incorporate WaveTop software into Windows 98's WebTV for Windows, a feature of the forthcoming operating system that uses a TV tuner card to receive Web-based programming delivered via TV signals.



WITH A TV TUNER CARD and WaveTop software, you can have Web pages delivered to your PC via a little-used portion of the TV signal.

EIGHT CHANNELS

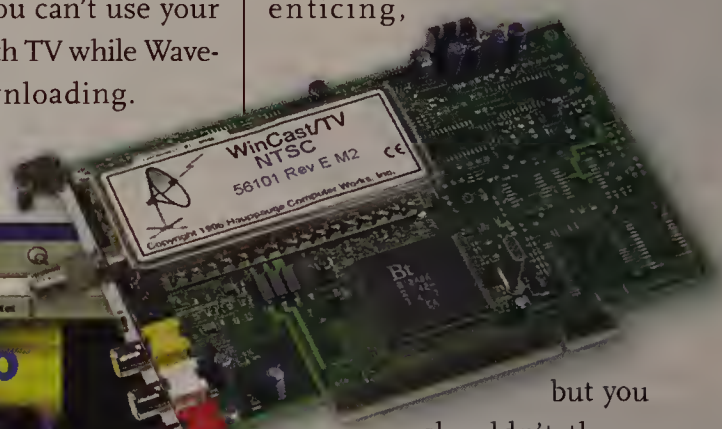
WAVETOP broadcasts over signals from PBS's 264 member stations; when your local station shuts down for the night, the updates stop. Content is organized into eight "channels" that appear as buttons in IE 4.0 (the service won't work with other browsers). Except for channels from Time Inc. and ZDNet, most of these are proprietary (NewsTop, StockTop, KidsTop, etc.), based on content from *USA Today*, the *Wall Street Journal*, the Weather Channel, Quote.com, and CBS SportsLine. Depending on the number of channels you activate, WaveTop saves as much as 170MB of data to a cache on your hard drive, which it cleans every 10 days.

Another button, GuideTop, displays a content delivery timetable—an important feature since you can't use your tuner to watch TV while WaveTop is downloading. If you were planning to watch a lot of TV on your monitor, this could pose a real problem: Updates range in frequency from every 15 minutes (for Quote.com) to once a week. Also, if you leave your PC on 24 hours a day to catch all updates (as WaveTop recommends), expect your hard disk to click away like a metronome as long as your computer is on and your local PBS outlet is broadcasting.

The service is free—advertisers include Barnes & Noble, the Spiegel Catalog, Ford, and CyberMeals—but there's a catch: To receive it, you must give WaveTop some demographic information about yourself. WaveTop vice president Sandy Goldman says that the company supplies this information—along with page-viewing reports—in aggregate to advertisers; individual subscriber data stays confidential, so you won't get spammed.

KEEP YOUR MODEM

THE PROSPECT of fast, phone-free Web surfing is certainly enticing,



but you shouldn't throw away your modem yet: You'll still need conventional Internet service to link to pages that WaveTop doesn't download.

In my tests of a beta version, the Weather Channel's pages—with their bounty of graphically intense, up-to-the-hour weather maps—sprang onto the screen in seconds. But when I tried to get a local forecast, I had to wait for my modem to dial up my usual ISP. And you'll want to make sure that you're using cable; rabbit-ear reception is too spotty.

As more PCs come equipped with TV tuners and Windows 98, WaveTop will offer an easy option for digest-type browsing of some big-name content partners. But it's unlikely to replace your conventional ISP anytime soon. Speedy Web pages are cool—but only if viewers get to choose the ones they want to see.

—*Michael S. Lasky* ▶

WaveTop
Free download (10MB)
WavePhore
www.wavetop.net

DIGITAL ILLUSTRATION: JEFF BERLIN

The IQ Test.™

Check the box to indicate which product offers a better value for the price.

Product Name:	ZipPlus™	SparQ™	ZipPlus by Iomega®	SparQ by SyQuest®	Same
Drive Size:	100 Megabytes	1,000 Megabytes	☐	☐	☐
Drive Price:	$199	$199	☐	☐	☐
Cartridge Size:	100 MB	1,000 MB	☐	☐	☐
Cartridge Price:	10 Disks (1GB) = $129	1 Disk (1GB) = $39	☐	☐	☐
Seek Time:	29 ms*	12 ms*	☐	☐	☐

Product Name:	Jaz™	SparQ™	Jaz by Iomega	SparQ by SyQuest	Same
Size:	1 GB	1 GB	☐	☐	☐
Drive Price:	$299	$199	☐	☐	☐
Cartridge Price:	$124	$39	☐	☐	☐
3 Cartridge Price:	$299	$99	☐	☐	☐

Got an aptitude for spotting value? Then you've probably deduced that the SparQ removable cartridge hard drive from SyQuest gives you a lot more for your money than ZipPlus or even Jaz. If you want to increase your storage capacity (and show off your genius) make the smart move to SparQ. To find a retailer near you, and also test your storage savvy to win some great SyQuest merchandise, visit our web site at **www.syquest.com/IQ**

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Circle 217 on reader service card

Intel's One-Stop Tech Support

INTEL IS GETTING into the tech support business. The company's AnswerExpress Support Suite will field your questions about hardware (Pentium-class PCs and peripherals of all sorts) and software (Windows 95 and more than 200 applications). The cost is $49.95 for the first three months, $14.95 a month thereafter. You get seven free queries during the first three months, and one per month after that; once you've used up your allotment, subsequent questions cost $19.95 each. You also get an online backup service, virus protection, and tips and tutorials.

WE'LL CALL YOU

HERE'S HOW it works: When you encounter a problem, you launch the AnswerExpress app. As you fill out a form describing the situation, the program checks out your PC. When you're finished, the software sends your question and a diagnostic report to Intel via the Internet. An Intel techie then phones you to discuss the problem. If your computer's completely hosed, you can access the service by phone. In informal tests, Intel called back just 2 minutes after I posted a note on the Web site; when I phoned, I waited 50 minutes for the callback. The company says its goal is to respond within 10 minutes no matter which way you try to make contact.

Unfortunately, the answers provided aren't always helpful or correct. To test the service's hardware acumen, I reported that some funky colors were showing up in my Windows 95 wallpaper (I'd renamed the video card's driver). The Intel techie who called back correctly surmised that "something is corrupted in your video driver." When he suggested I reinstall it, I asked him how—and he told me to call Compaq. Not what I wanted to hear for my $49.95.

Next, I called with a question about Microsoft Word: How do I get all new documents to sport justified text? The technician told me to click on the Format toolbar's Justify button. Will that justify text in each new document, I inquired innocently, knowing it wouldn't (you have to change the Normal style template). "I think so," she replied. Wrong.

> "Using the Internet to do support is more cost-effective for us than the telephone."

To be fair, such responses aren't unusual when it comes to third-party tech support: When *PC World* tested such services for an October 1997 article, we found most providers similarly deficient.

THIRD-PARTY CRASHERS

PLENTY OF players have tried to make a business of offering third-party tech support to the consumer market. Strangely, several—including Computer City, CompUSA, and other big retailers—are selling AnswerExpress alongside their own support programs.

But other vendors that have tried the third-party market have retreated. Sitel, for example, once offered a tech support service it called Primeline, which charged users by the problem. Sitel executive vice president Bill Vance recalls that complications often arose: "People would call with one problem, but then want help with other problems without always being willing to pay for it."

Doug Chandler, senior analyst with International Data Corporation in Framingham, Massachusetts, says, "Third-party consumer tech support hasn't been profitable in the past. With corporate users, you can expect focused questions. But it can be frustrating, time-consuming, and expensive to support consumers."

INTEL'S JIM JOHNSON on solving the third-party tech support problem: "Using the Internet is more cost-effective for us than the telephone."

Intel is confident that it has developed the right formula. "Using the Internet is more cost-effective for us than the telephone," says Jim Johnson, general manager of the company's Internet services operation. "Customers don't have to wait on hold. And the technician who calls back will be expert on the customer's particular problem."

But that still begs the question: Why is Intel doing this?

"We'd love to have a billion PCs on the planet," explains Johnson. "The question is, how do we get there? We need to have happy PC users."

—*Reid Goldsborough* ■

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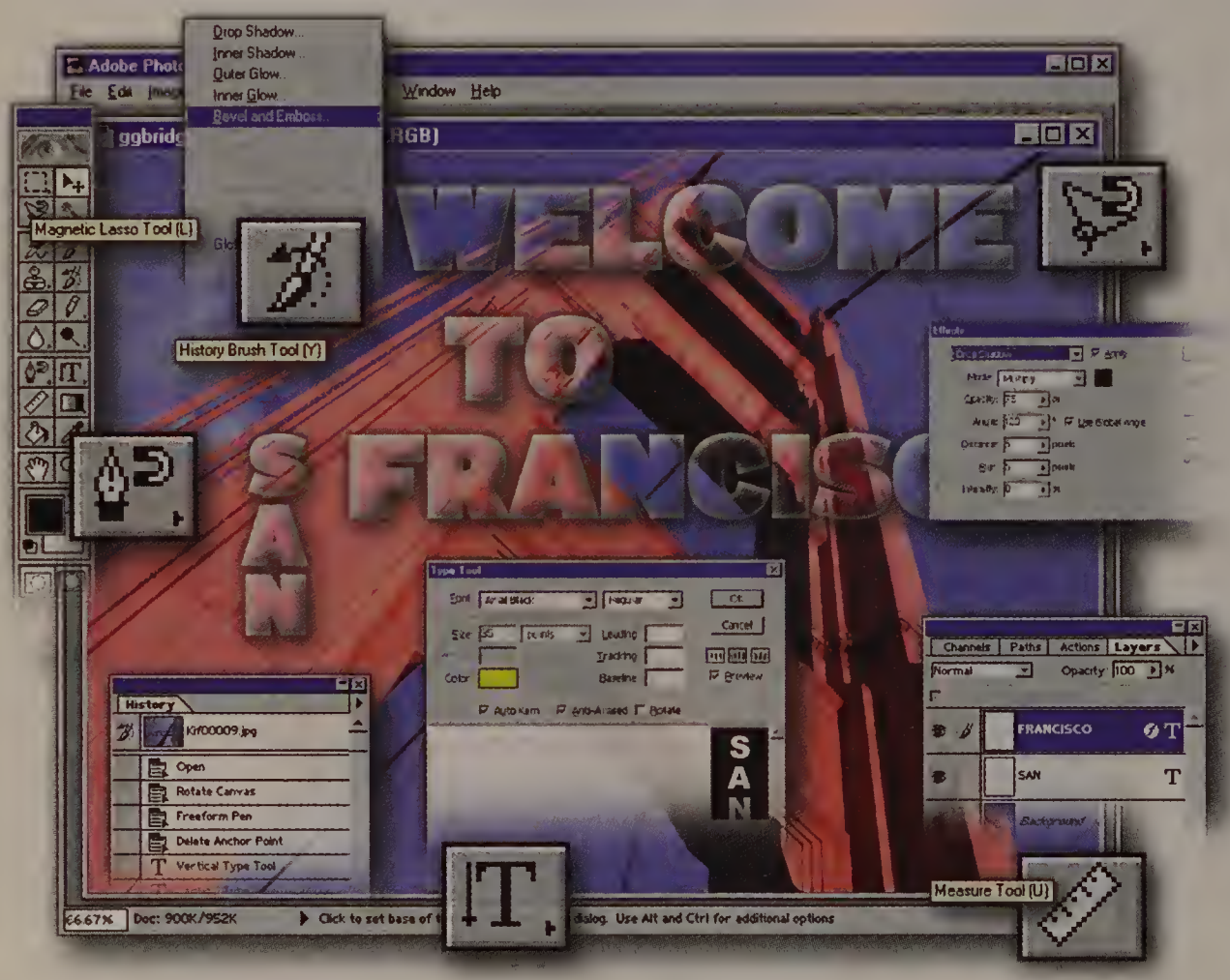
NEW PRODUCTS

Photoshop 5.0: Building a Better Image Editor



LONG TIME COMING: Photoshop 5.0 delivers requested features like multiple undo (history palette, bottom left) and editable type layers (bottom center), used here to add bevels and place the word "San" vertically.

GRAPHICS

IF YOU'RE SERIOUS about computer graphics, you know Adobe Photoshop is the standard against which all other professional image editors are measured. The latest edition of Adobe's flagship product, **Photoshop 5.0** ($699, or $199 for the upgrade), doesn't look much different from its predecessor. But it delivers a collection of new features and refinements that will save you time, especially if you do a lot of repetitive work.

Heading the list of useful innovations is the history palette, which tracks your editing steps and lets you do multiple undos—handy when you want to jump back to a specific operation. The History Brush lets you apply previously created effects onto other images. And Photoshop now offers editable text layers, so you can add vertical text, edit text color directly in the Type Tool dialog box, and apply text attributes such as kerning, leading, and font size. You can even add layer effects—drop shadows, outer glow, bevels, and embossing (the last two are particularly useful for Web page buttons).

TIGHTER CURVES, TRUER COLORS

I ALSO LIKED the Magnetic Lasso and the Magnetic Pen, which snap to the edges of irregularly shaped objects for easy outlining. While the lines in my tests of a preproduction copy weren't always faithful to the object's contours, they certainly worked well enough—and they also simplified the process significantly. The Freeform Tool, imported from Adobe Illustrator, offers an improved means of drawing Bezier paths (mathematically calculated curves). The color matching and adjustment tools have been upgraded, and you can now measure the distance between any two points for more precise layouts.

The latest version of Photoshop also features a handy new tool that lets you adjust the size and position of 3D objects on top or in front of 2D images. Other new tools make it easy to resize graphics files and to export images that have a transparent background—advances in functionality that Web page designers in partic-

Photoshop 5.0

PRO: Loaded with features, better editing functionality, new tools.

CON: Still slow and complex.

VALUE: Top-notch image editor for graphic artists.

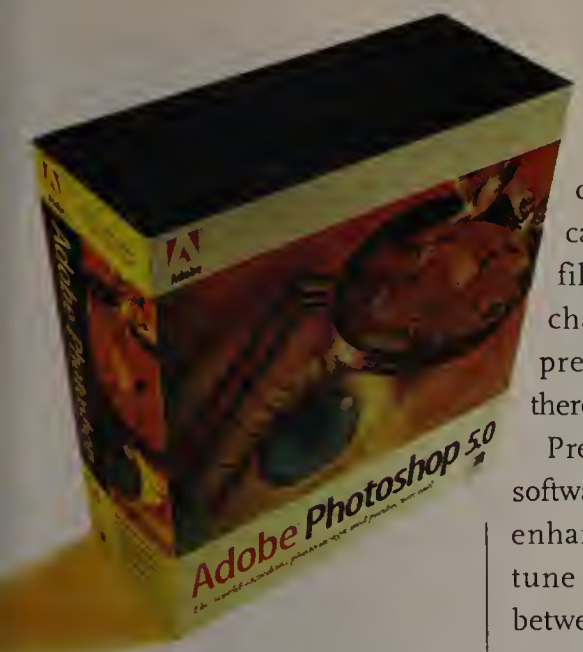
Street price: $699 (upgrade $199)

Adobe Systems

800/492-3623

www.adobe.com

READER SERVICE NO. 799



THE INTERFACE is familiar, but Photoshop's new tools will make repetitive tasks go quicker.

ular will appreciate. Designers will also welcome the Save a Copy command, which discards extraneous graphics file information (alpha channels and thumbnail previews, for example), thereby shrinking saved files.

Prepress pros will like the software's color management enhancements, which fine-tune the color calibration between your monitor, scanner, and printer. Adobe has also added spot-color channels for re-creating unusual colors and finishes, such as metallic inks and varnishes, in your printed images.

Adobe didn't tweak Photoshop's underlying engine, so working with high-resolution files won't go any quicker. And mastering its complexities still requires time and graphics expertise; beginners should stick with simpler packages such as Adobe's own PhotoDeluxe. But for experienced users who want better image control and precision, Photoshop 5.0 is worth the upgrade.

—*Grace Aquino*

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online

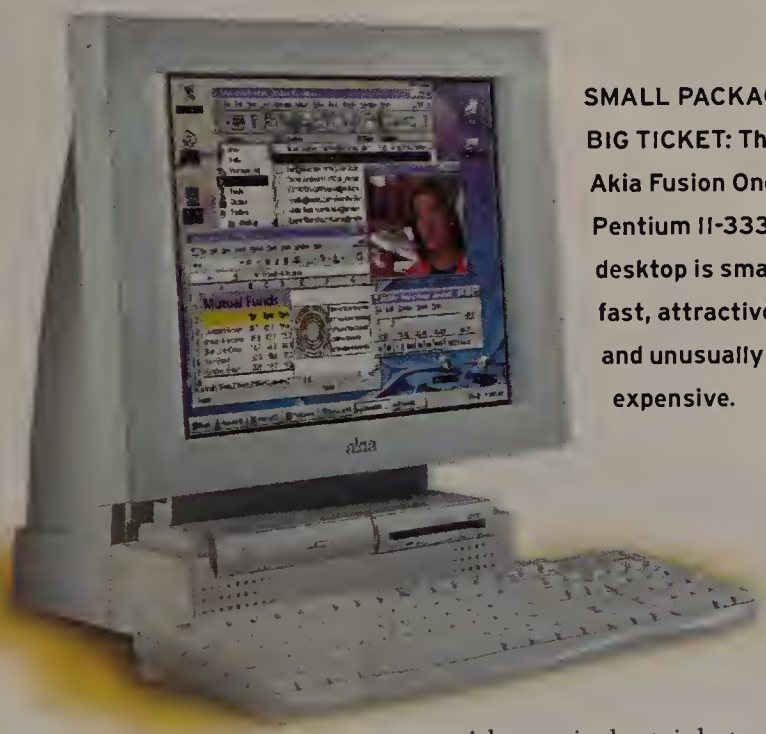
FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at www.pcworld.com/news.

Futuristic Fusion OneBox Blends PC and LCD

DESKTOP

AKIA'S APTLY named **Fusion OneBox 333** combines a small-footprint, Pentium II-333–based PC with a bright, crisp 14.5-inch active-matrix LCD to produce a complete desktop system that fits in one box. A good performer, with a PC WorldBench 98 score of 175 (marginally above average for a PII-333 system), the wedge-shaped OneBox stands out because of its unusual design and compact dimensions—just a shade over 15 inches tall, about the same width, and slightly less than 8 inches deep.

But don't let the sturdy handle fool you into thinking this PC is portable. The Fusion OneBox requires AC power and, at 22 pounds, won't go anywhere in a hurry. Justifying the $3699 cost (without the optional $100 modem) will be hard unless your office is the size of a Rubik's cube—or the letters *CEO* are stenciled on your door; a similarly configured standard desktop (64MB of SDRAM, 8.4GB hard drive, 8X–20X CD-ROM drive) with a 17-inch monitor sells for about $1000 less.



SMALL PACKAGE, BIG TICKET: The Akia Fusion OneBox Pentium II-333 desktop is small, fast, attractive—and unusually expensive.

The Akia's LCD screen is sharp, bright, and far gentler on the eyes than a conventional CRT monitor. The LCD, which boasts a resolution of 1024 by 768 dots per inch, attaches to the PC at the top with two industrial-strength hinges, so you can adjust the panel's vertical angle across a wide 90-degree range. The OneBox sports TV and S-video in and out plugs, front-mounted speakers, and a mike.

One caveat: Even though the Fusion OneBox contains one empty PCI slot, installing an upgrade card or other internal component is not for the faint of heart. We had to remove as many as 18 tiny screws (and expose some very delicate electronics) to access the PCI slot and the empty modem slot. So while this PC may look svelte and perform well, don't plan on upgrading it.

—*Susan Silvius* ▶

Fusion OneBox 333

PRO: Compact, fast; crisp LCD.
CON: Expensive, takes a lot of careful work to upgrade.
VALUE: Svelte, luggable PC with big, bright screen for cramped offices—or executive suites.
List price: $3699
Akia
800/936-5481
www.akia.com
READER SERVICE NO. 800

EDITED BY
Yardena Arar and Laurianne McLaughlin

Voodoo2 Chip Works Magic in Shooters

GRAPHICS CARDS

DIE-HARD GAMERS need a powerful 3D-only graphics card, like those based on 3Dfx's popular Voodoo chip. Now, the Voodoo has a successor. We tested two cards built around the Voodoo2: the **Diamond Monster 3D II** ($250 with 8MB of EDO DRAM) and the **Creative Labs 3D Blaster Voodoo2** ($299 with 12MB of EDO DRAM). Both come in 8MB and 12MB configurations.

Different amounts of RAM notwithstanding, the performance and image quality of these boards were almost identical—and virtually flawless. The only glitch arose when we played Redline Racer with the Monster II. With the Direct 3D driver that *PC World* uses in standard testing, the game wouldn't draw anything beyond the immediate foreground, so it always looked like you were about to drive off the edge of a cliff. But when we switched to the driver written specifically for the Voodoo2 chip—which comes with the game—the images were picture-perfect.

While our tests found little difference between the boards, extra RAM should help with texture-rich games like Epic MegaGames' Unreal, which are sure to proliferate as developers take advantage of this new technology.

When we compared the new boards to a first-generation Voodoo-based board—the Diamond Monster 3D—we didn't notice a pixel's worth of difference in image quality or speed during a test run of the flight simulator Flight Unlimited. A discernible performance difference cropped up only in first-person shooter games: Our hero in Quake on the Monster II machine was a few scenes ahead of the protagonist on the Monster machine. Why? Because shooter games are heavier on textures, at which the Voodoo2 excels.

Our conclusion: If you like to fly or race, you can probably hold on to your old Voodoo card a little bit longer. But if you're out to save the world from alien invaders, nothing will give you the edge like this latest crop of 3D-only cards.

—JoAnne Robb

Diamond Monster 3D II

PRO: Excellent 3D image quality and speed.

CON: Had problems with Direct 3D drivers in one game.

VALUE: A great buy for gamers addicted to first-person shooters.

Street price: $250 with 8MB; $300 with 12MB

Diamond Multimedia Systems

800/468-5846

www.diamondmm.com

READER SERVICE NO. 801

Creative Labs Blaster 3D Voodoo2

PRO: 8MB board is cheaper than the 8MB Diamond Monster.

CON: None.

VALUE: A good price for a powerful 3D board.

Street price: $199 for 8MB (after $30 rebate); $299 for 12MB

Creative Labs

800/998-5227

www.soundblaster.com

READER SERVICE NO. 802

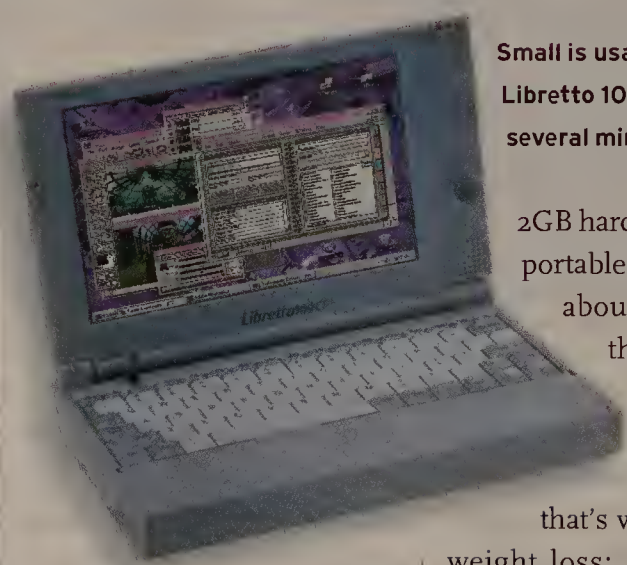
Play It Again, Libretto

SUBNOTEBOOK

AFTER HEARING all the griping about small keyboards on subnotebooks, I decided to take a typing test on Toshiba's new, ultraportable **Libretto 100CT**. How long would it take me to type "All work and no play makes Jack a dull boy"?

I had to scrunch my average-size fingers together to fit them on the 8-inch keyboard—and the Chiclet-size keys responded to the slightest depression, inviting typos. After ten tries, however, I got it right. Though my typing speed might make Mavis Bacon cringe, typing on this mini-note is doable.

So are most other general business tasks. The Libretto 100CT contains a faster CPU, a larger hard drive, an additional PC Card slot, and a bigger screen, battery, and palm rest than its predecessor, the Libretto 70CT. Black letters stand out in sharp relief on the 100CT's 7.1-inch active-matrix screen. Carrying a PMMX-166 CPU, 32MB of RAM, and a 2GB hard drive, the ultraportable costs $2499—about a grand more than a similarly configured, standard-size notebook. But that's what you pay for weight loss: At 3.8 pounds (with AC adapter and external floppy), the Libretto has half the heft of a regular portable.



Small is usable: The Toshiba Libretto 100CT contains several miniature upgrades.

The Libretto's main rivals—the $1999 Hitachi VisionBook Traveler 3000 and the $1995 Mitsubishi Amity CN—offer more keyboard space for better typing accuracy. But the 100CT has a faster CPU and includes a port expander—a nice touch.

Unfortunately, Toshiba put the eraserhead mouse controller to the screen's right and set the buttons outside the lid, requiring a lot of fancy finger work. Factor in the tiny keyboard, and the Libretto is too awkward for intensive computing. But for e-mail and light work on the road, it's fine.

—Vince Bielski ▶

Toshiba Libretto 100CT

PRO: Nice screen, fast CPU for tiny size, includes port expander.

CON: Awkward design for mousing.

VALUE: Perfect for sending e-mail and light writing on the road.

Street price: $2499

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Circle 135 on reader service card

Print 'n' Go With Canon's 2-Pound Ink Jet

PRINTER

NO DOUBT YOU'VE heard of subnotebooks. Well, the new **Canon BJC-50**—at a list price of $349—is what you might call a subprinter: About the same size as a cigarette carton and weighing just 2 pounds, this color ink jet qualifies as the company's smallest, lightest, most completely mobile printer.

Those scant 2 pounds include the weight of the BJC-50's built-in, rechargeable battery. They don't include the unit's AC adapter and parallel cable, but you can get along without these: The battery is good for about 100 pages of output on a single charge, and the printer includes an infrared port for wireless printing from notebooks. However, I wouldn't recommend that you print in a public place, such as a plane: the BJC-50's annoying whine will almost certainly bother your fellow passengers.

PETITE AND PORTABLE: The BJC-50 can print about 100 pages with its built-in battery.

In my informal tests of a preproduction unit, the BJC-50 cranked out about three plain-text pages per minute. That doesn't rival the speed of the quickest desktop ink jets, but it's much faster than Citizen's PN 60i, a $399 thermal printer that's smaller still. An optional high-capacity all-black ink cartridge makes monochrome printing speedier and cheaper; a $99 scanner cartridge turns the printer into a sheet-fed color scanner.

The BJC-50 doesn't come with a paper tray, so you must laboriously insert paper one sheet at a time—or pay $59 for the optional 30-sheet feeder, which will add weight and bulk. Alternatively, you could pay $50 less for the heftier (a whopping 3.1 pounds) BJC-80 with its built-in 30-page sheet feeder, but then you wouldn't get a built-in battery. If portability matters most, the BJC-50 could make a splendid traveling companion.

—Harry McCracken

Canon BJC-50

PRO: Tiny, lightweight, includes built-in battery.

CON: Noisy, costs more than similar desktop models.

VALUE: Great for printing in limited quantities on the road.

List price: $349

Canon Computer Systems

800/652-2666

www.ccsi.canon.com

READER SERVICE NO. 740

Xerox's Well-Supported SOHO Laser

PRINTER

AFTER YEARS OF successfully plying the direct-to-corporate-buyers trade in photocopiers and network printers, Xerox hopes to bring its awesomely recognizable brand name to the retail market: The **DocuPrint P12** laser printer is the company's first foray into the retail small-office/home-office market. And judging from my experience with a shipping version, Xerox has produced a winning option for small workgroup printing.

The P12's $699 street price makes it competitive with other printers in the 12-page-per-minute class. Its speed keeps pace, too: Text comes out at about 9 ppm, graphics at about 2. Features are fairly standard, including adequate paper capacity (a 250-sheet input tray, expandable to 500 for $185), and an optional network card ($299). At a resolution of 600 by 600 dots per inch, the print quality is satisfactory: Text is crisp, but grays are a bit fuzzy.

THEY CAN GET IT FOR YOU RETAIL: Xerox's DocuPrint P12 straddles the line between fast workgroup and low-cost personal laser printers.

Predictably, given Xerox's background in corporate sales, the P12 is backed by excellent support: You get an unrivaled three-year warranty (one year is more typical) and a lifetime of toll-free calls to tech support. Documentation—both printed and online—is lucid and helpful, with clear illustrations. If print quality is your main concern, you can do better; but if service is your first priority, the P12 is a good bet.

—Karen Silver ▶

DocuPrint P12

PRO: Competitive price; strong text quality; excellent technical support, warranty, and documentation.

CON: Gray-scale graphics lose detail, could be faster.

VALUE: A fine choice for small workgroups and home offices.

Street price: $699

Xerox

800/349-3769

www.xerox.com

READER SERVICE NO. 741

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MMX intel inside pentium® PROCESSOR

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- 32MB SDRAM
- Modular 3.5" Diskette Drive, 24X CD-ROM[1] Drive & Zip™ Drive
- Removable 2.1GB Ultra DMA Hard Drive
- 56Kbps PC Card Modem[2]

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$83/mo., 36 Mos.

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Circle 242 on reader service card

Sparkling SparQ Outdistances the Zip

STORAGE

WITH THE INTRODUCTION of its **SparQ 1.0GB** removable cartridge drive, SyQuest has made it cheaper than ever to back up lots of data. Though the $199 unit may not be the least expensive backup drive on the market, its 1GB cartridges cost $39 each—or just about 4 cents for each megabyte. In sharp contrast, the 100MB disks used by the $150 Iomega Zip drive cost users roughly 13 cents per megabyte. If you have huge amounts of data to back up, you might prefer to work with a faster removable mass storage device such as SyQuest's $299 SyJet. But for creating smaller-volume personal backups, the SparQ is the best bargain around.

That's not to say it's perfect. When I attached an external model to the parallel port of my notebook PC (an internal EIDE model is available for the same $199 street price), I immediately ran into a series of minor installation glitches. The first couple of times I inserted the SparQ cartridge, it didn't seat properly in the drive. There isn't any autoload mechanism, and you have to press down on the cartridge until it "snaps" into place. Unfortunately, you can't actually hear or feel this happening; a simple visual or audio cue would have been nice.

Then, while I was running the SparQ's installation software, my PC froze. It took me a while to troubleshoot the problem, but I finally figured out that the installation software conflicted with my system's antivirus utility. After I disabled the virus scanner, the remainder of the setup went smoothly. However, I had to come up with that fix on my own, with no help from the package's documentation. It would have saved me time if SyQuest had recommended disabling the antivirus software during installation—a suggestion I've seen in several other installation wizards.

Once my cartridge drive was up and running, I found the software utilities sparse but useful (though I could have done without all the promotional photographs of SyQuest headquarters). I was also very favorably impressed at how swiftly the SparQ drive performed: The unit took slightly more than 2 minutes to back up 83MB of data from my Pentium-133. On the other hand, a portable Iomega Zip drive (also attached via parallel port) took more than 10 minutes to save the same amount of data from a Pentium-166 desktop PC (see "A Gig in Your Pocket," March 1998, page 135). The SparQ has a one-year warranty, and the cartridges are warranted for five years.

One piece of practical advice for prospective SparQ users: SyQuest generously throws in a load of extras with the SparQ drive—a 1GB starter cartridge, along with a bunch of software, including Serif's DrawPlus 3.0 graphics package. Unfortunately, all of that bundled software, including the installation files for the drive itself, is situated on the starter disk. So if you don't want to lose any original software you might need later, make sure that you pick up a second cartridge to use for performing your actual backups.

Still, that small glitch and the tricky setup don't negate the SparQ's winning combination of high-speed performance and low-cost media.

—*Brad Grimes* ▶

GET MEGABYTES FOR MINIBUCKS: SparQ's cartridges cost only about 4 cents per megabyte.

SparQ 1.0GB

PRO: Fast backup, remarkably low cost per megabyte.

CON: Setup mishaps, marginally useful starter cartridge.

VALUE: Cheapest way to store lots of data on a removable disk.

Street price: $199 (for either external or internal EIDE)

SyQuest Technology
800/245-2278
www.syquest.com

READER SERVICE NO. 742

QUICK TAKES

Computer Art 101

COMPUTER ARTISTS who want the look of paint, pastel, or charcoal have long turned to MetaCreations' Painter. But with a $299 price tag and a dizzying array of toolbars, brushes, papers, and other options, Painter 5 is not for the graphics novice or casual artist. Now, for $99, **Painter Classic** delivers Painter's natural-media capability with a pared-down collection of brushes. It lacks extras like multiple layers and color management, but it lets you re-create work in video playback style or produce works of art based on photos. The first-rate manual includes several practice projects. To enjoy this software fully, you need a pen tablet (drawing with a mouse is awkward). Overall, it's a great introduction to computer art. • **MetaCreations;** 800/846-0111; www.metacreations.com.

READER SERVICE NO. 743

—*Yardena Arar*

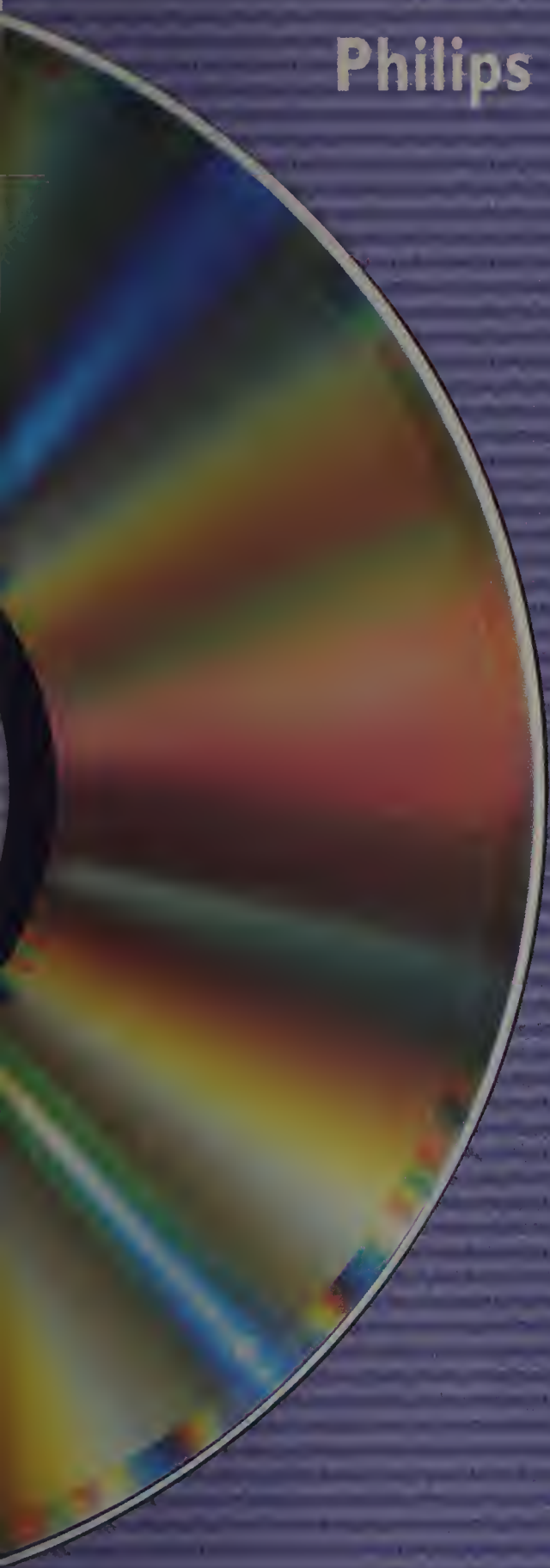
Fast Business Graphics

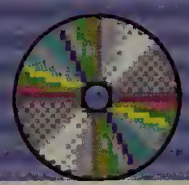
WANT TO TURN your photos into business cards, brochures, or even Web page banners? Then check out Adobe's new $99 **PhotoDeluxe Business Edition.** It's as easy to use as its popular sibling, PhotoDeluxe 2.0, but comes with a more business-oriented collection of templates, such as letterheads, flyers, and direct-mail cards. Additional new features include a photo-stitching tool for turning two or three images into a single panoramic photograph, and a photo enhancing tool for adjusting image contrast, saturation, and sharpness. I wish it supported more than one level of undo, but otherwise PhotoDeluxe continues to deliver terrific image enhancement and special effects tools that make photo projects quick and painless. • **Adobe;** 800/238-5972; www.adobe.com.

READER SERVICE NO. 744

—*Grace Aquino*

Create a CD on your PC with the Philips CD-ReWritable Drive.





Robert Kendall

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Compaq Deskpro EP Series, Small Business Solutions

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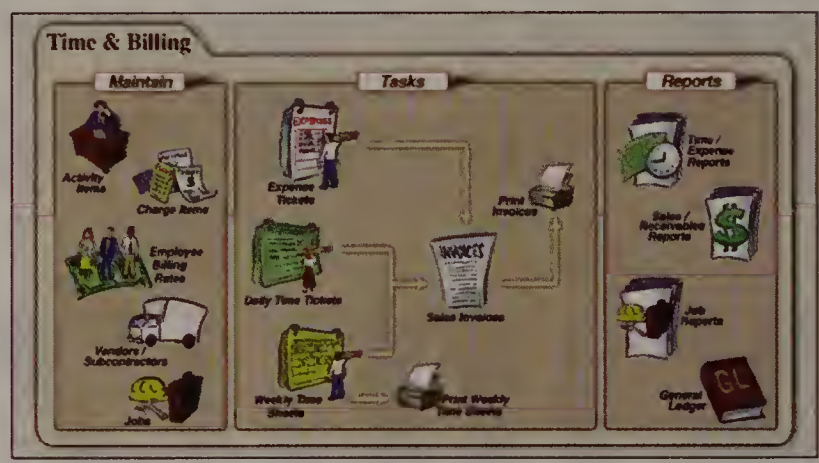
MMX™ intel inside pentium® II processor

COMPAQ

Accounting and More: Peachtree and MYOB

ACCOUNTING

INTUIT's QuickBooks may hold the lion's share of the small-business accounting market, but competing products from BestWare and Peachtree Software are mounting a challenge. Upgrades to Peachtree Complete Accounting Plus Time & Billing and to MYOB Accounting Plus and MYOB Premier Accounting boost power—especially in the areas of inventory tracking and multiuser capabilities—and improve ease of use.



FOLLOW THE MONEY: Peachtree Complete Accounting Plus Time & Billing 6.0 tracks service-related tasks via a new flowchart interface.

Peachtree Complete Accounting Plus Time & Billing 6.0 is the follow-up edition of the Best Buy in our last business software roundup ("Everything You Need to Run Your Business," October 1997, page 176); and at first glance, it doesn't look very different. The program's major functions, for example, are still readily accessible from buttons located at the bottom of the screen. Alternatively, you can navigate via flowcharts that use colorful icons to display the correct sequence of financial tasks, and these charts have been enlarged and enhanced. In particular, they now provide easy access to time and billing reports that deliver a clear picture of the services rendered. Data entry screens in the new version are significantly cleaner than their forerunners, while still giving users the flexibility to change the journal entries created by each transaction.

One significant competitive advantage of Peachtree Complete is that it's multiuser out of the box, so you don't have to buy a special version for group use. It also has better password protection than MYOB.

The only problem I ran into with a preproduction version of Peachtree arose when I tried to install the program into a nondefault directory. Otherwise, it's a strong package.

Release 7.5 of **MYOB Accounting Plus** (the single-user version of BestWare's MYOB accounting program) has added some powerful new features, too. Chief among them is OfficeLink, which permits you to generate Excel, Word, or WordPerfect files from MYOB Plus reports. (The preproduction version I tested worked only with the Office 95 versions of Excel and Word, not Office 97 editions; but the shipping version should include Office 97 support.) For example, you can convert a sales analysis report into Excel format for further slicing and dicing, or you can compose customized dunning letters in your favorite word processor. You can also save reports in HTML format. **MYOB Premier Accounting 1.1.1** (the multiuser version of the program) has most of Plus's features but not OfficeLink—yet; for that capability, you'll have to await the next release (due out late this summer).

MYOB has also juiced up its inventory tracking in both versions. Both programs can now automatically create back orders or generate a purchase order to replenish out-of-stock items. However, they still lack the time-tracking features—included in both QuickBooks and Peachtree—that could make them handier for service-related businesses.

Both upgrades are worth considering, but QuickBooks fans may want to wait for the multiuser version of it that Intuit plans to introduce shortly.

—Theresa W. Carey ▶

Peachtree Complete Accounting Plus Time & Billing 6.0

PRO: Good customizability, excellent interface, quick access to time and billing reports.

CON: Some installation hiccups if you don't accept all default settings established by program.

VALUE: Excellent fit for companies that bill their customers for both services and products.

Street price: $249

Peachtree Software

800/228-0068

www.peachtree.com

READER SERVICE NO. 745

MYOB Accounting Plus 7.5 MYOB Premier Accounting 1.1.1

PRO: Flexible and customizable; internally generates Excel, Word, WordPerfect, and HTML documents.

CON: Doesn't work with latest Word or Excel, tired-looking interface.

VALUE: Good program for product-only businesses, OfficeLink a welcome innovation.

Street price: $149 (Plus 7.5); $449 (Premier 1.1.1)

BestWare

800/322-6962

www.bestware.com

READER SERVICE NO. 746

QUICK TAKES

Peachtree for the Midrange User

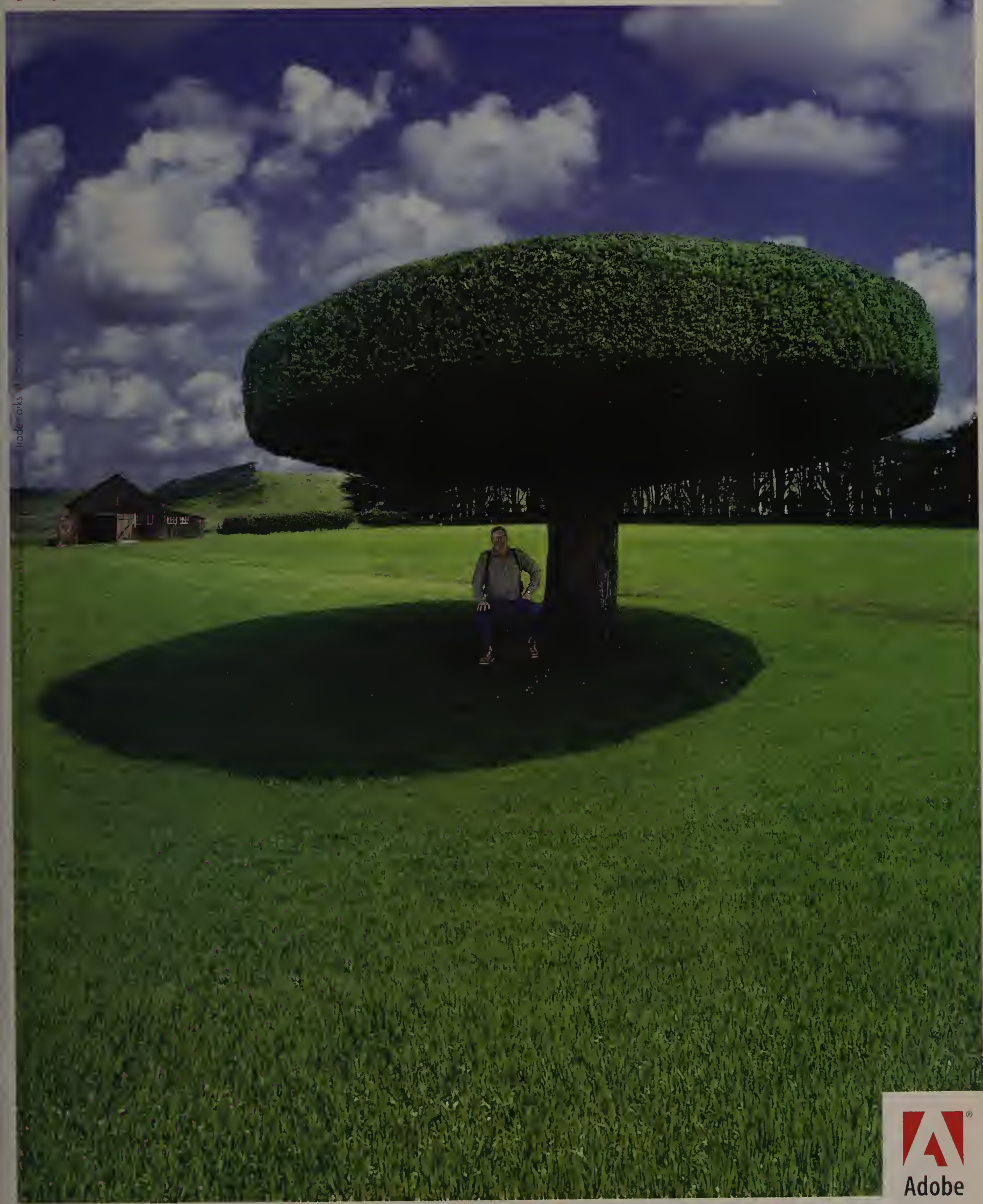
HAS YOUR burgeoning business suddenly outgrown your entry-level accounting software? Peachtree, one of the standard-bearers in the low-end accounting market, recently acquired MICA Accounting Software and has repackaged its ten-module midrange program under the name **Peachtree 2000.** Accounting packages at this level feature more robust inventory management than their lower-end siblings, along with job costing and payroll functions. In addition, they adhere more closely to generally accepted business accounting practices. Priced at $1999 to $2499 (depending on the number of simultaneous users), Peachtree 2000 provides an upgrade path for small but growing businesses (those with 5 to 100 employees). So if your company isn't ready to spend $10,000 or more on a Fortune 1000-level accounting system, consider Peachtree's crop.

• **Peachtree Software;** 800/228-0068; www.peachtree.com

READER SERVICE NO. 747

—Theresa W. Carey

Wouldn't it be nice if your work was *impossible* to ignore?



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Plustek's Affordable One-Stop Scanner

SCANNER

LOOKING FOR an inexpensive color scanner to take on documents, photos, slides, and negatives? Then try the $149 Plustek **OpticPro 9636T.**

This 11.5-by-17.4-inch flatbed scanner delivers 36-bit color at resolutions of up to 9600 dots per inch (600 by 1200 dpi native) for documents measuring up to 8.5 by 11.7 inches. Nothing exceptional there, but the OpticPro 9636T also has a transparency unit built right into its cover, so you can scan 35mm slides and negatives.

MULTIFUNCTION SCANNING ON A SHOESTRING: The OpticPro 9636T scans both film and documents for under $150.

The preproduction version I tested was simple to install and operate. After I connected the OpticPro to my PC via a parallel port connector with pass-through printer adapter, it consistently produced good-looking images in various test scans. The two 35mm film holders—one for slides, one for negative strips—fit easily under the scanner's cover.

The OpticPro's ample software bundle includes Adobe PhotoDeluxe 2.0 and Micrografx Picture Publisher 7.0 for image editing; Xerox TextBridge Classic for optical character recognition; and a utility for faxing and copying. In addition, Plustek's scanning software provides an excellent step-by-step guide for novices.

Though it lacks an automatic document feeder, the OpticPro 9636T is a versatile scanning choice—and it's easily the most affordable all-in-one scanner we've seen to date.

—Richard Jantz

OpticPro 9636T

PRO: Inexpensive, scans both documents and film, simple installation.

CON: Lacks an automatic document feeder option.

VALUE: Great price for solid multifunction scanner.

Street price: $149

Plustek USA

800/685-8088

www.plustek.com

READER SERVICE NO. 748

QUICK TAKES

Scanner With Scads of Software

EAGER TO PLASTER your photos on everything from brochures and e-mail to Web sites? In a crowd of low-cost scanners, Storm Technology's $149 **TotalScan** color flatbed stands out with a lavish software collection. You get Xerox Pagis SE for document management and optical character recognition; Storm's EasyPhoto for organizing your scanned images; and Adobe's PhotoDeluxe 2.0 for photo editing. Storm also bundles Design Intelligence's I Publish desktop and Web publishing software, and Ixla Photo Scanner Suite, Internet Edition, for template-based Web site creation and publishing. Extras include programs for making animated greeting cards and online photo albums. TotalScan is not the cheapest 30-bit, 1200-by-600-dpi scanner: Some $100 competitors offer a comparable scanner and basic document management, OCR, and photo editors. But they won't give you comparable desktop and Web publishing tools. • **Storm Technology,** 888/438-3279, www.stormtech.com.

READER SERVICE NO. 749

—Yardena Arar

OCR That Needs Hand-Holding

OCR

VISIONEER MADE its new **ProOCR100** optical character recognition package as easy to use as the company's popular PaperPort scanner/document manager. But good OCR software must cope with many kinds of documents, and the ProOCR100 can't.

In my tests of a shipping copy with default settings, ProOCR100 made a hash of all but the simplest documents. The program moved lines in a newspaper article over a column or two and changed column widths; inserted dozens of periods in the headline; rendered periods as commas; and misspelled several words. It did much better after I carefully mapped out the text areas and their relationships, and instructed the software to ignore headers and page numbers (information you may want to retain). On a magazine page with many design elements, ProOCR100 moved chunks of columns, changed type sizes, and converted many words into boldface, even after I laboriously indicated the article's flow. Competing products such as NewSoft's Presto OCR don't need this sort of hand-holding.

ProOCR100's template support, batch processing, and on-screen documentation are top-notch. Its interface couldn't be simpler—just a fat row of numbered, labeled buttons—and the software spells well. And at $49.99, it's definitely affordable. But its inability to understand document structure makes ProOCR100 useful only for lightweight jobs.

—Dan Littman ▶

Visioneer ProOCR100

PRO: Excellent documentation, simple interface, inexpensive.

CON: Requires laborious user intervention for acceptable results.

VALUE: Too much trouble to use.

List price: $49.99

Visioneer

800/787-7007

www.visioneer.com

READER SERVICE NO. 750

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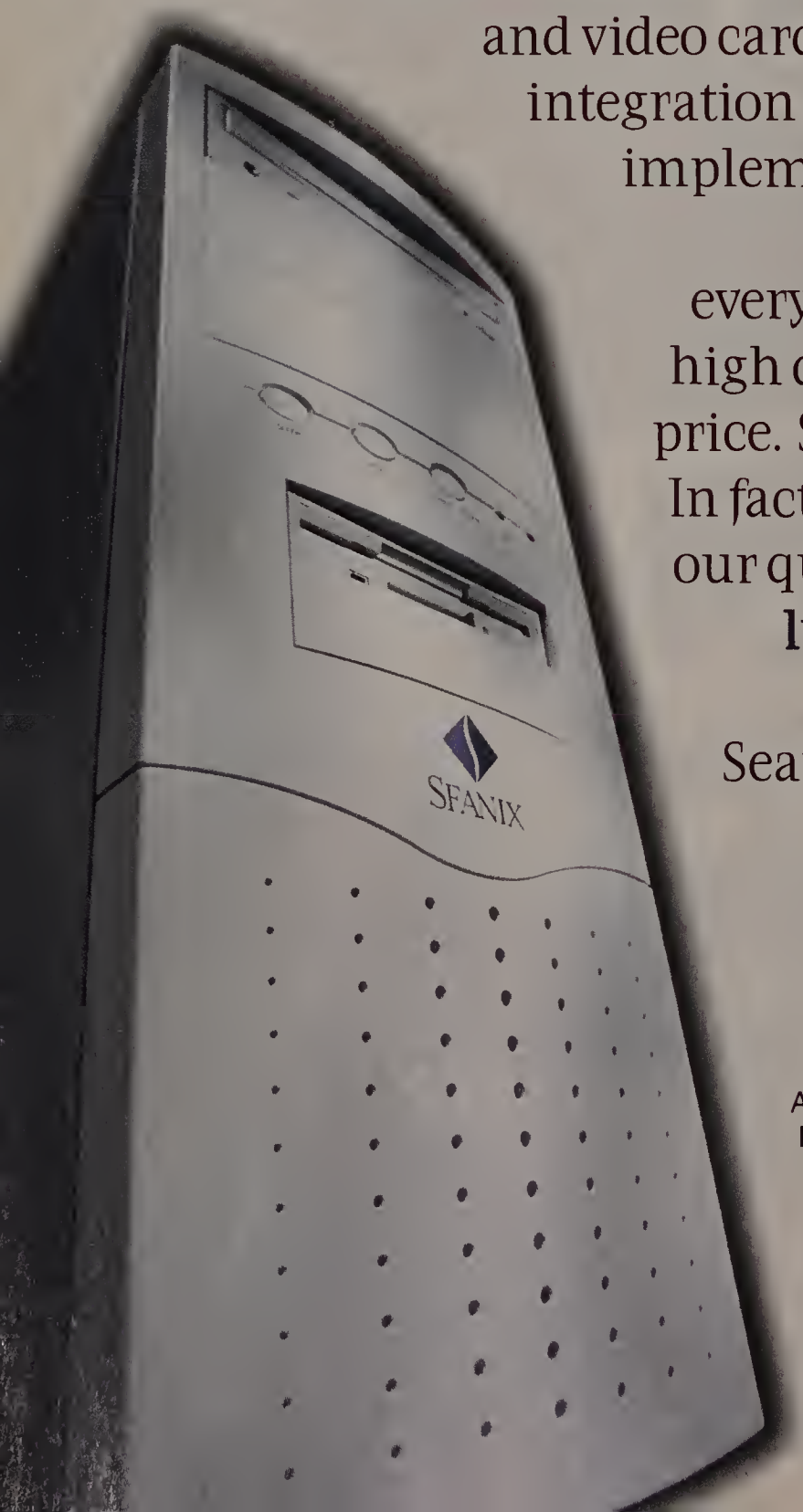

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Seanix 19" Monitor, .26mm
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Drive Copying: A Better Way to Back Up

UTILITIES

WANT A BACKUP of your hard drive, or a clone to copy to a brand-new drive? Consider a drive copying utility.

These handy programs run in floppy-bootable DOS and let you restore everything—including your exact installation of Windows 95, NT, or another operating system—on your drive. They can't do such conventional tasks as selectively backing up files or working with tape, but they're great for quickly and accurately restoring entire drives or partitions.

I examined preproduction versions of three copying utilities: PowerQuest's Drive Image, Quarterdeck's DiskClone, and Micro House's ImageCast. All three can copy your drive to another hard drive, a network drive, or a removable medium such as a Zip drive. They can store the copy as a compressed file (so you can fit more backups on your media) or simply copy one drive onto another.

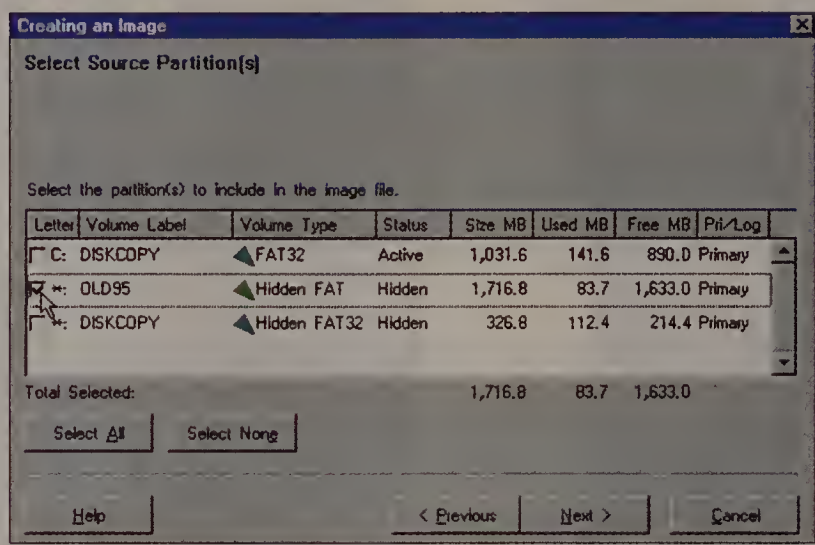
Even though **Drive Image 2.0** is a DOS program, Windows users will feel at home in its graphical, Wizard-like interface. The ease of use extends beyond the interface. If you want to restore a 2GB partition to 1GB of space, Drive Image adjusts the partition on the fly (assuming that the original had only 1GB of files on it). Drive Image 2.0 comes with a separate Windows program, the Drive Image Editor, for extracting individual files from an archive—if the image file is uncompressed. You can uncompress an archive in the Editor, if you have room.

DiskClone performs one basic task: copying from a source (a drive or an image file) to a target (again, a drive or an image file). Its interface isn't perfect: DiskClone warns you about the danger of writing an image to the source drive—even if you're writing it to a totally different drive. Also, the software can't copy or restore individual partitions, only whole drives—a serious limitation if you've split up your drive.

Micro House's ImageCast is intended for network administrators; **ImageCast LE** is a free scaled-down version. Unfortunately, ImageCast isn't very friendly. The setup program installs two system management-oriented Windows programs and puts shortcuts to them on your desktop, but it doesn't indicate how to launch the actual copying program. Once you do, you're confronted with strange prompts. Who would think that a dialog box saying 'Save to File' is asking which drive you want saved?

Still, ImageCast LE is free, making it fine for a one-time cloning job. If you can't figure it out, buy DiskClone. But if you plan to back up your drives routinely, get Drive Image.

—*Lincoln Spector* ▶



IT LOOKS LIKE WINDOWS, but it's Drive Image 2.0, a DOS program that can make exact copies of any or all of your partitions.

Drive Image 2.0

PRO: Copies whole drive or partition, restores individual files.

CON: Can't restore individual files from compressed image.

VALUE: Best program of its kind.

Street price: $70 ($55 after rebate)

PowerQuest

800/379-2566

www.powerquest.com

READER SERVICE NO. 751

DiskClone

PRO: Small, simple to use.

CON: Can't copy or restore individual partitions.

VALUE: Useful if you haven't partitioned your drive.

List price: $69.95 (Extra Strength); $39.95 (Regular Strength)

Quarterdeck

800/354-3222

www.quarterdeck.com

READER SERVICE NO. 752

ImageCast LE

PRO: Free.

CON: Difficult to use.

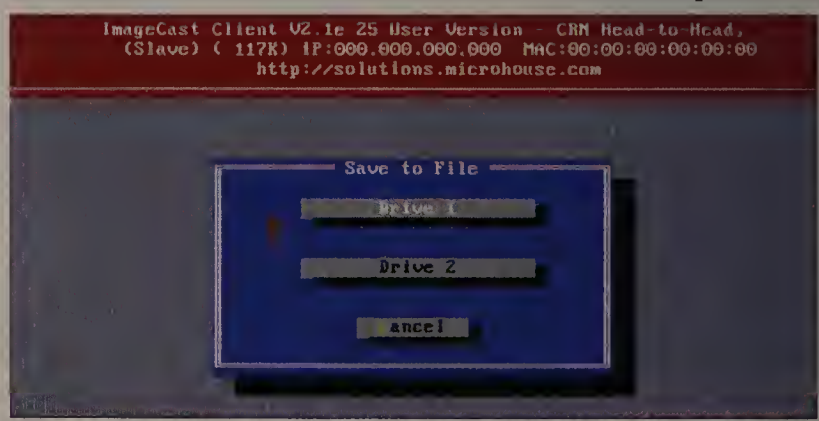
VALUE: Can't beat one-time price.

Price: Free

Micro House

800/926-8299

www.microhouse.com



WHAT DOES 'SAVE TO FILE' MEAN? It means the designers of ImageCast LE didn't know how to say 'Copy which drive?'

QUICK TAKES

Making International Connections

PLANNING TO TRAVEL abroad? A phone adapter may hook you up to the wall jack, but your trusty notebook modem may not connect in such locales as, say, Budapest or Rio. Why? Dial tones vary from country to country. 3Com's $269 56K Global Modem PC Card—the 3CM1556—is configured for use in more than 250 countries; I put it to the test to file this Quick Take from Prague. Most modems require you to type in abstract modem codes before you phone home from overseas. With the 3CM1556, which uses 3Com's x2 56-kbps technology (upgradable to the new V.90 56-kbps standard), you simply run the bundled utility, click on the country where you're located, and you're ready to go. When in Rome, dial as the Romans do. • **3Com**; 800/638-3266; www.3com.com.

READER SERVICE NO. 753

—*John Goddard*

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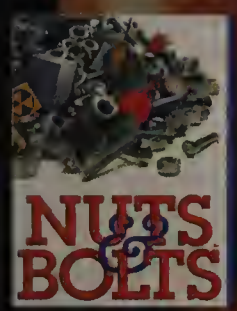

How do you see yourself? Intelligent? Savvy? Productive? Choose the wrong utilities tool for your PC maintenance and a certain other description will undoubtedly come to mind. The smart choice is McAfee® Nuts & Bolts.™ That's because, compared to Norton, McAfee offers a far more comprehensive package. With a total of 18 software tools, McAfee Nuts & Bolts gives you better control over system diagnosis, optimization and, most importantly, deadly crashes. PC Magazine saw it that way when they chose McAfee Nuts & Bolts over Norton for their 1998 PC Magazine Editors' Choice Award. So get McAfee Nuts & Bolts. And get back to feeling like yourself again. Visit www.nai.com/dm/ad2.asp or your local retailer.

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Your Personal Web Traffic Reporter

WEB UTILITY

WHAT IF YOU built a Web site and nobody came? Or to take a more positive but still problematic case, what if everybody came? Without a tool to check the log files your Web server generates, you'd never know. Several packages will do the job, but the **WebTrends Log Analyzer 4.1** is one of the most convenient packages I've seen for monitoring Web site traffic—and at $299, it's also one of the most affordable.

Most Web server programs automatically create a text file in a common format that tells you which individuals are visiting your site, when they're logging on, how often they're returning, and exactly how long they're sticking around to look at various individual pages. (If you don't have your own server, you should be able to gain access to log files for your site from your Internet service provider.)

Log Analyzer grabs these files, compiles a report complete with colorful graphs and clear tables, and displays the whole shebang as a Web page, a text file, or a Microsoft Word or Excel document—or in any of a number of other formats.

After using Log Analyzer for a couple of weeks, I learned that most people enter my site at the home page—no surprise. But I also found that most of my visitors exit after seeing only my home page, which is a problem. My average visitor stays less than 2 minutes. But that time has been going up a bit over the past week, so perhaps my content is getting better.

I do have a couple of minor complaints: Some of the program's graphs are hard to read (because the colors are too similar), and the labeling system could be clearer.

Of course, sites that log millions of hits every day will probably need far fancier and more expensive tools that can quickly analyze enormous log files. But for small- to medium-size sites, Log Analyzer gets the job done simply, swiftly, and at a reasonable price.

—Paul Heltzel

WebTrends Log Analyzer 4.1

PRO: Easy to install and use, intuitive interface.

CON: Tables could have been made easier to understand.

VALUE: A good choice for nontechnical users who need to gauge Web site traffic.

List price: $299

WebTrends

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www.webtrends.com

READER SERVICE NO. 754

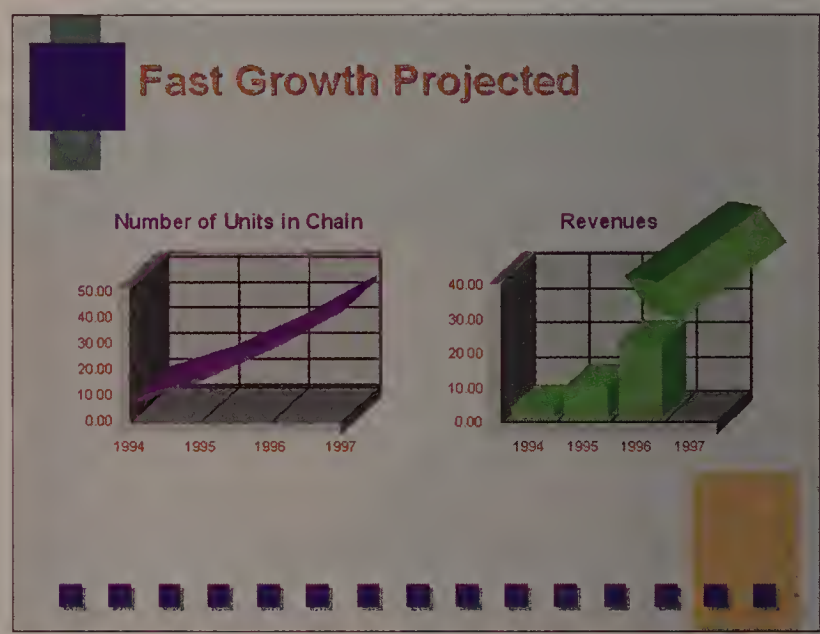
Multimedia Presentations That Astound

PRESENTATIONS

IF YOUR presentation software experience is limited to Microsoft's PowerPoint, transitioning to the multimedia might of **Astound 5.0** will feel like stepping directly from boring suburbia into Disneyland in midsummer.

Though it is among the last of a dying breed of stand-alone multimedia presentation packages, Astound is no dinosaur: To the contrary, it's a powerful tool, more on par with Macromedia's Director than with Microsoft's old and pizzazz-starved standby. And with the latest additions to its already impressive array of Web options, the $149 Astound 5.0 can be used to produce everything from a simple color printout to an animated, interactive online presentation.

The sheer volume of options at your disposal can be overwhelming, however. The program's excellent online and print manual tutorials help you overcome the embarrassment of riches, but casual users who don't need high-end fireworks are probably better off looking elsewhere for their presentation needs.



LOOK ALIVE: Astound 5.0 presentation software creates animated charts and graphs that tumble into place before your very eyes.

Those who stick around can assemble presentations from scratch or build them from several basic templates, and they can output the results to dynamic HTML for Web presentation without the need for plug-ins. (Previous versions required viewers to install a special Astound applet.) The Web Conference Publisher program included in the box even allows real-time Web conferencing, using Java applets to facilitate live chat.

And for all you Microsoft diehards out there, Astound now supports PowerPoint 7.0 presentations, too, so Office veterans can perform all the basics with the app they know, and then switch to Astound to add multimedia flair.

—Glenn McDonald ■

Astound 5.0

PRO: Terrific multimedia power, new Web features.

CON: Too involved for casual users.

VALUE: A solid tool for whizbang presentations, online or off.

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Astound

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www.astound.com

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400-MHz Pentium IIs

The great leap forward

BY LAURIANNE McLAUGHLIN

Thanks to a faster bus and souped-up memory, Intel's new 350- and 400-MHz chips flat out fly. But do you need the speed?

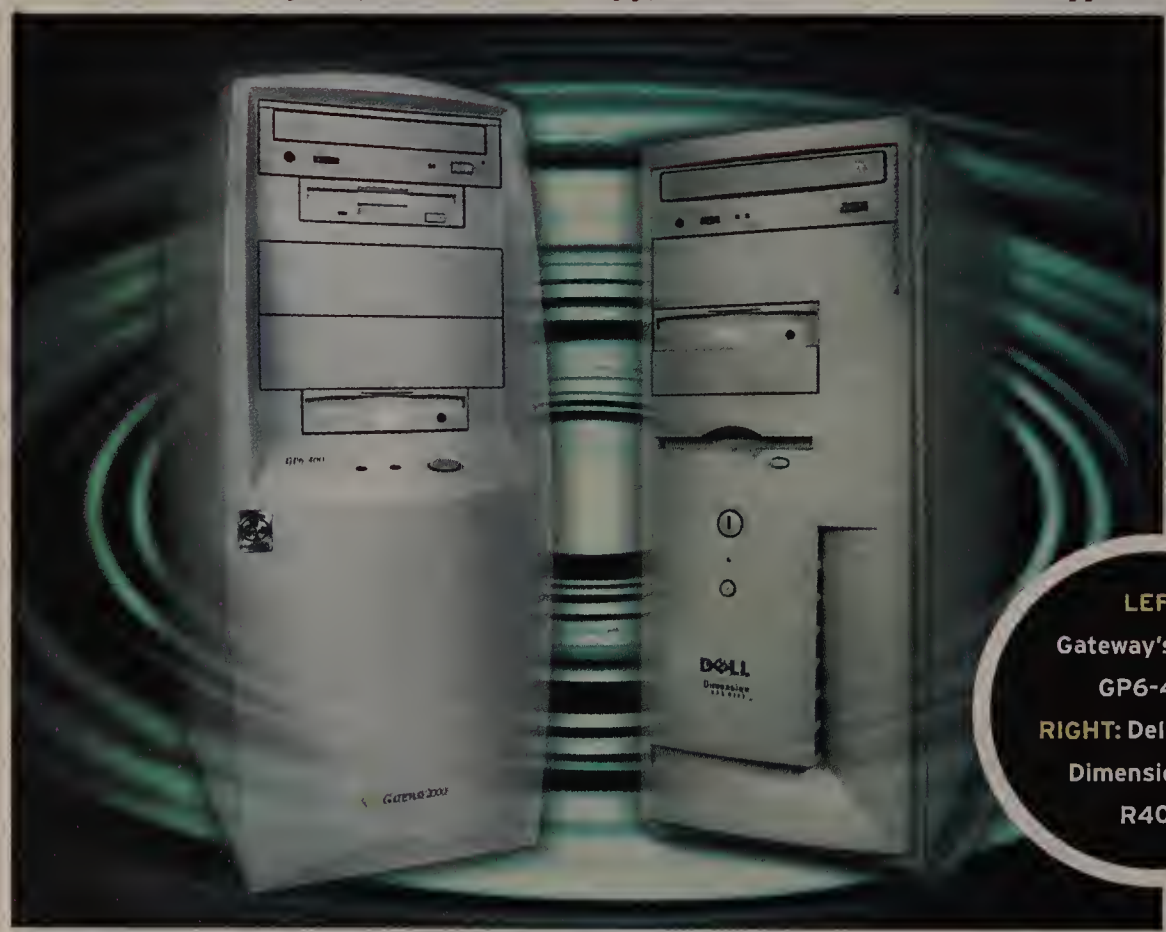
INTEL IS THE CONSUMMATE FLIRT. With each new chip, the giant chip maker promises us speed, brawn, and sparkle, enticing us to buy yet another PC. The problem is, we're getting bored with the relationship. The small advances in performance of the last year or so haven't set our hearts aflutter. But the new systems built around the Pentium II-400 will. By speeding up the system bus—a main pipeline for moving data between the CPU, main memory, and other components—from 66 MHz to 100 MHz, Intel delivers dramatic performance gains with its new chips. On average, the 400-MHz Pentium II systems we tested run PC WorldBench 98, our business application benchmark, 21 percent faster than the Pentium II-333s. Got your interest now? ▶

CLOCKWISE FROM TOP: Micron's $3199 Millennia 400, HP's $2750 Vectra VL, NEC's $3115 Direction SPB 400.

HERE'S ANOTHER PLUS: Prices are lower than you think. PII-400 systems (with 64MB of SDRAM, AGP graphics cards with 4MB of SGRAM, and 17-inch monitors) start at $2750 for a Hewlett-Packard Vectra VL Series 8, a corporate model, and $2769 for Gateway's GP6-400, a small-business or home-office system. To round out the field, we tested four other new PII-400s: the Compaq Deskpro EP Series Model 6400, Dell Dimension XPS R400, Micron Millennia 400 DVD Edition, and NEC Direction SPB 400. Like all new PII-400s, they sport motherboards with Intel's new 440BX chip set and use 100-MHz SDRAM for main memory.

Vendors are also shipping PCs that feature Intel's other new processor, the Pentium II-350, along with the snappier bus and new chip set. We tested three: the Dell Dimension XPS R350, Micron Millennia 350 DVD Edition, and NEC Direction SPB 350. How did the PII-350s fare? Well, their average PC WorldBench score was an impressive 192, compared to 170 for the PII-333s. But the PII-400s scored an average of 205 and cost only $150 to $200 more than their PII-350 counterparts. So if you can afford it, a 400-MHz system is the way to go.

Those PII-400 prices seem even more reasonable when you consider chip introductions of the recent past. When we reviewed the first PII-300 systems in October 1997, the three we tested cost $4080, $3799, and $3499. PII-400 and PII-350 system prices are starting out lower than that and should remain steady this summer—prices probably won't drop until the 450-MHz Pentium II chip arrives in the fall. If you can wait until then, you'll pay a bit less.



LEFT: Gateway's $2769 GP6-400. RIGHT: Dell's $3249 Dimension XPS R400.

But if you need the power now and can't afford the top of the line, a Pentium II-333—or even a Pentium II-300—with 64MB of RAM will do an excellent job on day-to-day business applications. By the time you read this, 300-MHz machines will cost less than $2000, and more cuts are expected by the end of the year. The downside? You won't get the same investment protection, because upgrading PII-333 systems means replacing the CPU, motherboard, and main memory.

CATCH THE BUS

ALL THIS TALK of bus speeds might seem abstract, but such fundamental design changes are what allow Pentium II-350 and Pentium II-400 systems to outrun any x86 computer (see "100-MHz Bus: A Faster Data Highway"). In the past, new generations of chips ran faster than their predecessors, but because the bus was limited to 66 MHz, the actual increase in performance was relatively small.

Think of it this way: No matter how fast your automobile can go, your travel time is restricted by the road's speed limit. Likewise, no matter how fast a CPU can crank, the time it takes to complete a task depends on the speed limit of the system bus. When a computer application asks the CPU and main memory for information, the system bus is the road along which that information must travel.

In PII-350 and PII-400 systems, that speed limit has risen from 66 MHz to 100 MHz. Data transfers on the new bus take less time, so the application finishes the job more quickly.

Of course, sometimes bus speed doesn't matter. A moderate-size word processing file, for example, will fit comfortably within the confines of the 512KB secondary cache found on most newer PCs. The CPU can access that data directly without having to drive up and down the system bus.

But files that don't fit into the cache force the CPU to go searching for data in the main memory, which is accessed via the system bus. This situation occurs when you are manipulating a large graphics image, running a data mining application, or using a CAD program. A large amount of information is passed back and forth to the application, and the 100-MHz system bus gets the job done faster.

There's one other piece to this puzzle: memory. The 100-MHz bus uses 100-MHz SDRAM. So when you add memory to your 350- or 400-MHz Pentium II system, be sure the extra memory you buy is marked "PC 100." If it isn't, it could be

If you can afford it, a 400-MHz system is the way to go.

memory that doesn't meet Intel's specifications (and therefore may not produce optimal speed), or it could be 66-MHz memory, which may work on your system, but at a much slower pace.

DASHING BUSINESS APPLICATIONS

THE BOTTOM LINE in the PC WorldBench results for the six 400-MHz systems: They all flew. We found only small differences among the PC WorldBench scores, which rate business application speed. Micron's machine ran fastest, scoring 210; Dell's PC ran slowest, scoring 199—only 6 percent slower than the Micron. The HP and NEC systems each rated 207, while the Gateway and Compaq machines received marks of 204 and 200, respectively.

To put these numbers in context, consider the PC WorldBench scores earned by less muscular PCs. On average, the PII-400 systems ran 21 percent faster than the PII-333s (a score of 205 for the PII-400s versus a score of 170 for the PII-333s). More impressively, the PII-400s were 29 percent faster than the PII-300s (a score of 159 for the PII-300s) and 37 percent faster than the PII-266s (a rating of 150 for the PII-266s).

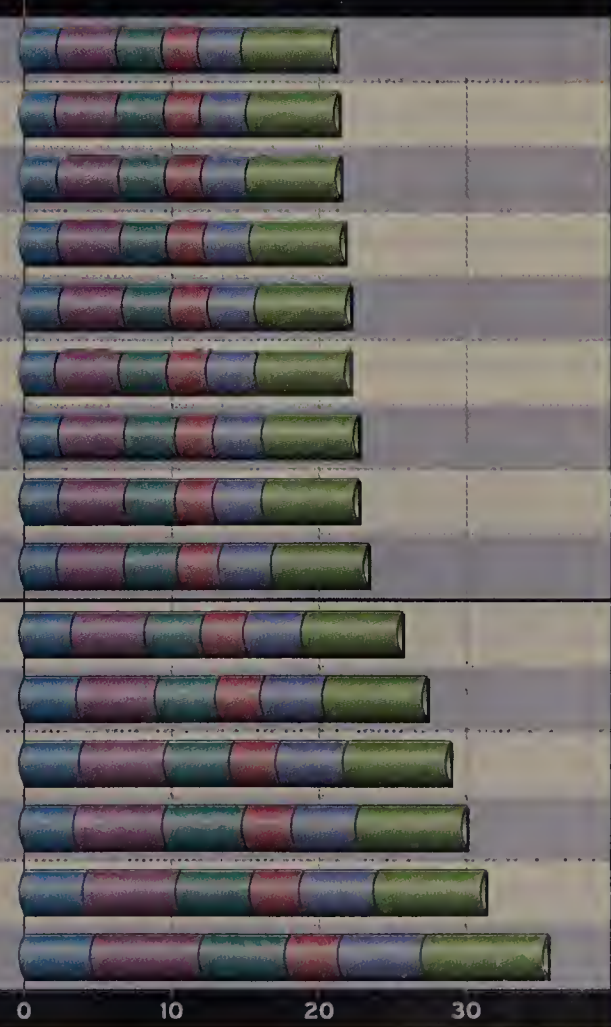
The performance gap is even wider when you compare ▶

TEST REPORT

PII-400s: Blazing Speed for Business Apps

Think your Pentium II-333 is fast? The Pentium II-400 is 21 percent faster.

SYSTEMS	CPU	RAM (MB)	Secondary cache (KB)	PC WorldBench score
Micron Millennia 400 DVD Edition	PII-400	64	512	210
Hewlett-Packard Vectra VL Series 8	PII-400	64	512	207
NEC Direction SPB 400	PII-400	64	512	207
Gateway GP6-400	PeII-400	64	512	204
Compaq Deskpro EP Series Model 6400	PII-400	64	512	200
Dell Dimension XPS R400	PII-400	64	512	199
NEC Direction SPB 350	PII-350	64	512	195
Micron Millennia 350 DVD Edition	PII-350	64	512	194
Dell Dimension XPS R350	PII-350	64	512	187
Average of 17 systems	PII-333	64	512	170
Average of 22 systems	PII-300	64	512	159
Average of 5 systems	PII-266	64	512	150
1 system	AMD K6-266	64	512	145
Average of 3 systems	PII-233	64	512	138
Average of 2 systems	PMMX-233	64	512	123



Word 97 · Word Pro 97 · Excel 97 · 1-2-3 97 · Paradox 8.0 · Picture Publisher 7.0

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with Windows 95, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing).

COMPAQ'S $3029 DESKPRO: A good choice for business or graphics apps.

the 400-MHz PCs to the Pentium MMX systems still sitting on many desks. The PII-400's score is a stunning 67 percent higher than the average MMX-233 PC WorldBench score of 123. So it's no surprise that the Pentium MMX will be dropped from Intel's desktop lineup by the end of this year.

Will 350- or 400-MHz systems make a difference you'll notice in everyday business apps? You bet. But it'll vary depending on the specific task and the system you're using now. For example, a 5MB Excel file opens and recalculates much faster on a system with one of the new 100-MHz buses than on a 333-MHz Pentium II-based PC. Likewise, a book-length word processing file is much easier to handle on a 400-MHz system than it is on a similarly configured 300-MHz PC. But with small files? "I couldn't tell the difference," says a *PC World* editor who participated in an informal test of the new systems. And the difference between the 350- and 400-MHz systems? "Hard to tell," says one of our most adept spreadsheet jockeys.

ZIPPY MULTIMEDIA

INTEL KNOWS THAT for many users, systems built around older processors offer more than adequate performance on business applications. So Intel is making a point of touting the robustness of the 350- and 400-MHz systems on games and graphics applications. As we found, most of these PCs deliver as advertised.

All nine systems we tested performed well with 2D business applications, such as PowerPoint 97. But if you'll be using your system primarily for 3D games or modeling apps, be more selective. The HP Vectra is the only strictly-business machine in the bunch; its integrated Matrox Productiva G100 graphics chip didn't keep up with the graphics cards on the other machines. The HP failed to complete some tasks, like our 3D museum tour in Caligari TrueSpace 3, a modeling program. The system is a poor choice for game playing (see "Choose Your Weapon"), and we did not include the Vectra in our graphics performance chart. Consider the Vectra only if your graphics needs are limited to standard business and multimedia applications, where the system does just fine.

The five other PII-400 systems performed well on graphics tests when compared with two identically configured PII-333

PENTIUM II-400 AND PENTIUM II-350 SYSTEMS

PENTIUM II-400 SYSTEMS [1]	Street price	CPU	Hard drive	CD-ROM/DVD-ROM drive speed	Graphics adapter	Modem
Compaq Deskpro EP Series Model 6400 800/345-1518 www.compaq.com	$3029	Pentium II-400	Maxtor 6.4GB, 5200 rpm	12X-24X CD-ROM	Diamond Viper V330	none
Dell Dimension XPS R400 800/388-8542 www.dell.com	$3249	Pentium II-400	IBM 14.4GB, 7200 rpm	2X DVD-ROM	STB Velocity 128	3Com 56K
Gateway GP6-400 800/846-2000 www.gateway.com	$2769	Pentium II-400	IBM 10.1GB, 7200 rpm	13X-32X CD-ROM	STB Velocity 128	none
Hewlett-Packard Vectra VL Series 8 800/839-6854 www.hp.com	$2750	Pentium II-400	IBM 10.1GB, 7200 rpm	14X-32X CD-ROM	integrated Matrox Productiva G100	none
Micron Millennia 400 DVD Edition 888/634-8799 www.micronpc.com	$3199	Pentium II-400	IBM 10.1GB, 7200 rpm	2X DVD-ROM	Diamond Viper V330	3Com 56K
NEC Direction SPB 400 888/863-2669 www.necnow.com	$3115	Pentium II-400	IBM 14.4GB, 7200 rpm	14X-32X CD-ROM	Diamond Viper V330	3Com 56K
PENTIUM II-350 SYSTEMS [1]						
Dell Dimension XPS R350 800/388-8542 www.dell.com	$3099	Pentium II-350	IBM 14.4GB, 7200 rpm	2X DVD-ROM	STB Velocity 128	3Com 56K
Micron Millennia 350 DVD Edition 888/634-8799 www.micronpc.com	$2999	Pentium II-350	IBM 10.1GB, 7200 rpm	2X DVD-ROM	Diamond Viper V330	3Com 56K
NEC Direction SPB 350 888/863-2669 www.necnow.com	$2915	Pentium II-350	IBM 14.4GB, 7200 rpm	14X-32X CD-ROM	Diamond Viper V330	3Com 56K

[1] All systems have 64MB of SDRAM, a 512KB secondary cache, a 17-inch monitor, and an AGP graphics card with 4MB of SGRAM.

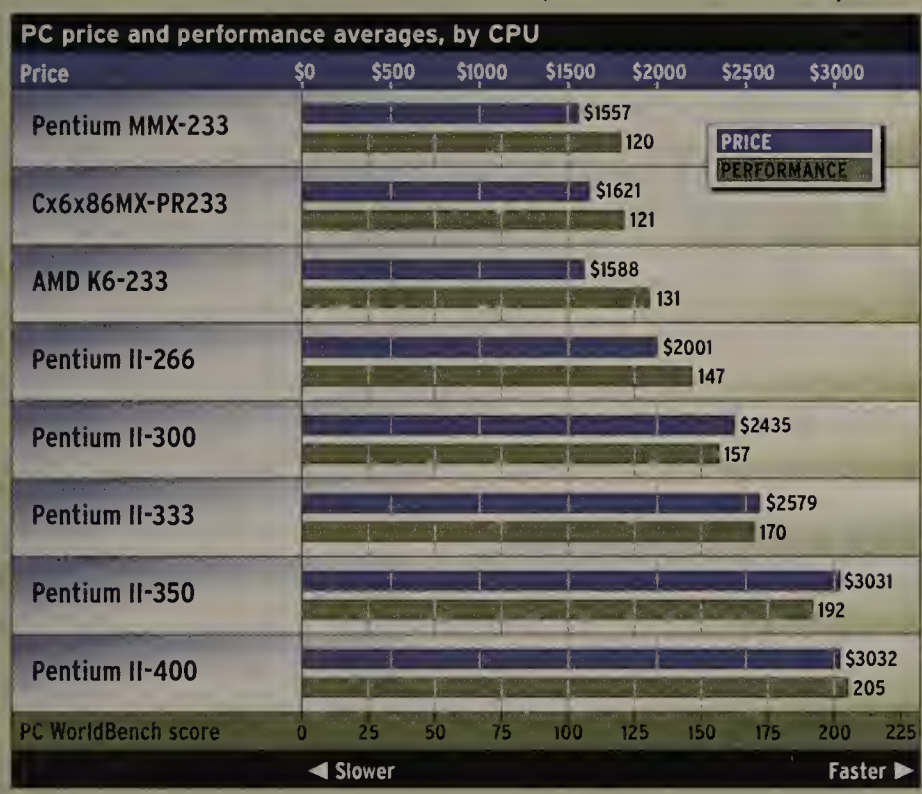
For now, Intel has the high end of the market to itself.

machines. On average, the PII-400 PCs ran just 4 percent faster on the PowerPoint 97 test, which involved streaming video. But they ran 23 percent faster on Caligari and 16 percent faster on Macromedia Director 6, a multimedia authoring tool. The gains achieved by the new systems might have been even bigger if we hadn't used NEC and Dell PII-333 systems that were slightly faster than the typical 333. (We modified the PCs by installing hard drives and graphics cards identical to those in the 400-MHz PCs to eliminate variables in our testing.)

Although we don't use Adobe Photoshop in our benchmark testing, we thought the popular program might run much faster on a Pentium II-400 than on a Pentium II-333. Not so, says our graphics tester, *PC World* Senior Designer Jeff Berlin. On simple tasks such as cutting and pasting that normally take just a few seconds, the difference between the PII-400s and the PII-333s wasn't really noticeable. And even on more complex, time-consuming jobs, Berlin says that he did not find the disparity dramatic.

The Price of Power

Dollar for dollar, PII-400s offer the best performance boost in years.



Our gamers were considerably more psyched about the new systems. Our tests pegged the PII-400s as about 10 percent faster than the PII-333s on Redline Racer and Turok Dinosaur Hunter, a 3D shoot-'em up. That boost gives much better game play, explains Nash Werner, features editor of games.net, who participated in an informal hands-on test. "The 333 dropped many more frames," he says. "That disrupts the flow of the game."

When the action got complex and monsters covered the screen, the image quality of both the 350- and 400-MHz PII-400 systems was much better than that of the 333-MHz systems. But even a gamer as experienced as Werner had trouble telling the PII-350 from the PII-400. One reason the PII-400 didn't deliver more punch: Today's games don't push the CPU very hard. According to Intel, though, you'll notice a bigger difference as games get more sophisticated.

FEATURES COMPARISON

Sound adapter	Additional features	Software	Reader service number [2]
ESS 1868	none	Compaq Insight Personal Edition, Compaq Diagnostics for Windows	711
Turtle Beach Montego A3D PCI	internal Zip drive, Dell ACS495 speakers with subwoofer	Microsoft Office 97 Small Business Edition or MS Home Essentials 98	712
Ensoniq Wavetable PCI Sound Card	internal Zip drive, 3Com 10/100 network card, Boston Acoustics MicroMedia Speakers with subwoofer	Microsoft Office 97 Small Business Edition	713
Aztec AZT-2320	3Com 10/100 network card, enhanced multimedia keyboard, scrolling mouse	HP Top Tools management software, McAfee VirusScan	714
integrated	internal Zip drive, Advent AV390PL speakers with subwoofer	Microsoft Office 97 Small Business Edition	715
Crystal PCI audio	Altec Lansing ACS90 speakers	Microsoft Office 97 Small Business Edition	716
Turtle Beach Montego A3D PCI	internal Zip drive, Dell ACS495 speakers with subwoofer	Microsoft Office 97 Small Business Edition or MS Home Essentials 98	717
integrated	internal Zip drive, Advent AV390PL speakers with subwoofer	Microsoft Office 97 Small Business Edition	718
Crystal PCI audio	Altec Lansing ACS90 speakers	Microsoft Office 97 Small Business Edition	719

[2] For more information about all products in this table, circle reader service no. 907.

STACKING UP THE SYSTEMS: NOTABLE FEATURES

THE DELL, Gateway, Micron, and NEC systems are aimed at small businesses or home offices (see the features comparison chart at left). All four of these PCs have speedy 7200-rpm IBM Deskstar hard drives, which work faster with large files than today's typical 5200-rpm drives.

Of this group, Gateway's $2769 GP6-400 is the cheapest system. It comes with a 10.1GB hard drive, a 13X–32X CD-ROM drive, an inter- ▶

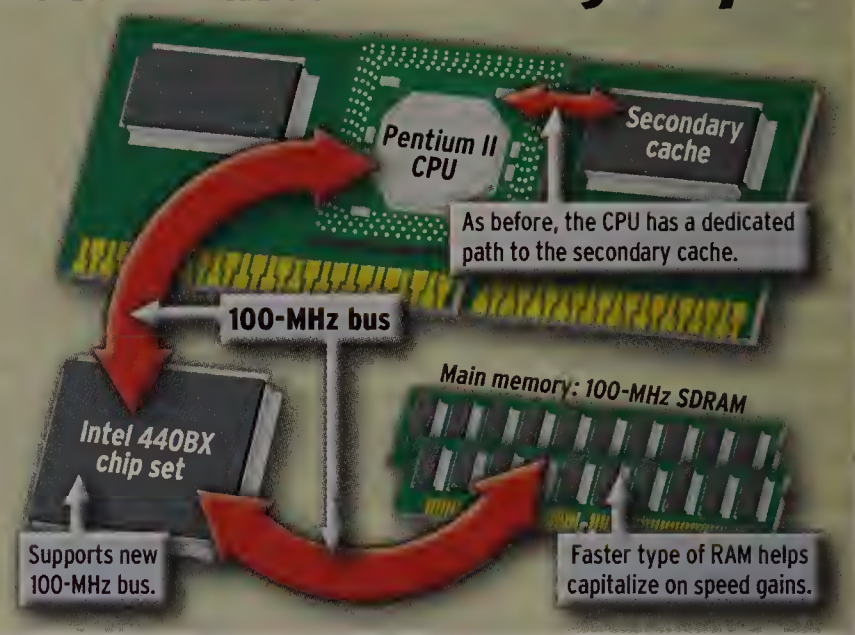
nal Zip drive, and a 3Com 10/100 network card.

Of the six PII-400s we tested, the $2750 HP is the most affordable business system, though the $3029 Compaq gets the nod if you plan to run any demanding multimedia. If you don't need the corporate network-oriented management software that comes with these two systems—for example, diagnostics that warn an IS manager when a system's hard drive or fan is faltering—consider the Gateway instead. It's only $19 more than the HP and has better graphics capabilities.

For small businesses or home offices, the $2769 Gateway and $3115 NEC are both solid choices, while the $3199 Micron gives you goodies like a DVD-ROM drive. The Dell, at $3249, is a bit pricey (it's the most expensive system in our review).

100-MHz Bus: A Faster Data Highway

There's more to system performance than just the speed of a processor. While the CPU flies at, say 333 MHz, the system bus crawls at 66 MHz. Intel's new PII-350s and PII-400s (with the BX chip set) use a bus running at 100 MHz, so information between the CPU and the main memory moves about 50 percent faster. That means performance on business apps is up 21 percent. Think of it as a road improvement.



With the PII-350 and PII-400 chips, Intel has the high end of the market to itself. For now. AMD's fastest chip is the K6-300, which the company has yet to produce in significant volumes. Cyrix's best is its just-introduced MII-300, which like the K6-300 runs on a 66-MHz bus (see next month's *PC World* for a review of the MII-300). Both these rivals of Intel have ▶

TEST REPORT

PII-400s Shine on 3D Apps and Games

But Pentium II-333s may be good enough for basic business graphics.

SYSTEMS	CPU	PowerPoint test (time in seconds[1]) ◀ Faster Slower ▶	Playback tests (frames per second[2]) ◀ Slower Faster ▶			
Compaq Deskpro EP Series Model 6400	PII-400	161	29.7	92.9	44.9	49.8
Dell Dimension XPS R400	PII-400	152	29.4	90.5	40.5	49.4
Gateway GP6-400	PII-400	157	28.8	92.5	37.7	47.0
Micron Millennia 400 DVD Edition	PII-400	157	30.3	92.8	40.6	48.4
NEC Direction SPB 400	PII-400	159	30.4	93.0	38.1	47.5
Dell Dimension XPS R350	PII-350	154	26.3	87.1	39.7	48.2
Micron Millennia 350 DVD Edition	PII-350	161	27.1	86.0	40.2	46.7
NEC Direction SPB 350	PII-350	160	27.7	89.9	37.6	46.1
Dell Dimension XPS D333	PII-333	159	24.1	76.3	34.4	42.8
NEC Direction SPL 333	PII-333	168	24.4	83.5	36.9	45.1

PowerPoint 97 · TrueSpace 3 · Director 6 · Redline Racer · Turok Dinosaur Hunter

TEST PC WORLD CENTER **HOW WE TEST** In Microsoft PowerPoint 97, we run and time a script that builds a 50-slide presentation by importing text, adding an AVI clip, graphics, charts, and animated transitions. In Caligari TrueSpace 3, a 3D modeling program, we play back a tutorial sequence that uses AGP textures and reports the average frame rate achieved. Using Microsoft Active Movie, we play back a looping AVI clip stretched to twice its native resolution, while running a Macromedia Director 6 animation in the foreground. We also execute self-running demos in two Direct3D games, Criterion Redline Racer and Acclaim Turok Dinosaur Hunter, both of which report average frame rate.

[1]Lower number is better. [2]Higher number is better.

INFOGRAPHIC: DANIEL CLARK

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EO710	17"	15.95"	0.26mm - High Contrast	1280	120Hz
EO720	17"	15.95"	0.26mm - MicroFilter™	1280	120Hz
EO90	19"	18.0"	0.26mm - High Contrast	1600	150Hz

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Circle 151 on reader service card

impressive plans for future high-performance products, and both have excellent offerings for entry-level PC buyers. But says analyst Mike Feibus of Mercury Research, nothing you'll be able to buy for three to six months is likely to top the performance of the PII-400.

AMD's K6 3D, which the company hopes to launch by midyear, will show up in systems with a 100-MHz bus. AMD believes its chips will get a jump of 10 percent or more from the new bus. But even so, AMD officials aren't sure they can push performance of the K6 3D beyond 350 MHz by the end of this year. The new chip will also contain a set of 3D instructions designed to rev up games. Another chip, the K6 3D+, is supposed to be released before the end of the year. With an integrated 256KB secondary cache and an initial speed of 350 MHz, the chip should render excellent performance. But will AMD be able to produce either of the new chips on schedule? Manufacturing problems have plagued the company for months.

On the other hand, Cyrix may be more interested in developing highly integrated chips for entry-level PCs and other consumer devices than in competing with Intel and AMD for the high-performance desktop market—now that it's part of National Semiconductor. Nevertheless, Cyrix says that the performance of the new MII-300 will be on par with a PII-300, and that it expects to move its chips to a 100-MHz bus later this year. Also on the company's horizon: powerful chips based on a new core called Cayenne as well as a successor to the highly successful MediaGX.

But that's all in the future. If you have to have a really high-performance machine right now, Intel-based systems face little competition.

Processor Milestones

386
Debut: October 1985
Speed: 16 MHz
Bus speed: 16 MHz

486
Debut: April 1989
Speed: 25 MHz
Bus speed: 25 MHz

Pentium
Debut: March 1993
Speed: 60 MHz
Bus speed: 60 MHz

Pentium Pro
Debut: November 1995
Speed: 150 MHz
Bus speed: 60 MHz

Pentium MMX
Debut: January 1997
Speed: 166 MHz
Bus speed: 66 MHz

Pentium II
Debut: May 1997
Speed: 233 MHz
Bus speed: 66 MHz

Pentium II-350 and Pentium II-400 (Deschutes, BX chip set)
Debut: April 1998
Speed: 350 and 400 MHz
Bus speed: 100 MHz

AMD K6 3D
Debut: May 1998
Speed: 300 MHz
Bus speed: 100 MHz

Mendocino
Debut: Expected fourth quarter 1998
Speed: 300 MHz
Bus speed: 100 MHz (expected)

AMD K6 3D+
Debut: Expected second half 1998
Speed: 350 MHz
Bus speed: 100 MHz

Cyrix Cayenne
Debut: Expected second half 1998
Speed: 300 MHz
Bus speed: 100 MHz

Katmai
Debut: Expected first half 1999
Speed: 450 to 500 MHz
Bus speed: 100 or 200 MHz

AMD K7
Debut: Expected first half 1999
Speed: 500 MHz
Bus: Alpha bus, 100 MHz+

Willamette or Pentium III
Debut: Expected 2000
Speed: 800 MHz
Bus speed: 133 MHz (expected)

Choose Your Weapon

HAVING THE FASTEST processor doesn't guarantee great 3D graphics. HP's Vectra VL uses an integrated Matrox Productiva graphics chip; the NEC's SPB 400 has a Diamond Viper graphics card. Both have the same CPU. The results (below) are obvious.

TUROK: On HP's Vectra VL (left) and NEC's SPB 400 (right).

SHOULD YOU TAKE THE LEAP?

THE NEW PENTIUM II-400 systems give you the best combination of price and performance for business and graphics applications that we've seen in some time. The new Pentium II-350 machines are excellent performers, but if you can afford the extra $150 to $200, go for your vendor's top of the line.

But first, ask yourself: Do I really need that much speed? If you're already working on a PII-266 or better, the answer is probably no, unless you're running demanding graphics applications or games or are working with large spreadsheet files. Even then, consider a new graphics card or extra system memory before you buy a new system. Keep in mind the price you'll pay for more performance (see "The Price of Power").

But then again, if you're ready to upgrade an older Pentium-based system and can afford to spend $2700 or more, these new 400-MHz systems pack a performance boost you'll appreciate. Applications and large files open rapidly, graphics are fluid and more lifelike, and even enormous spreadsheets recalculate quickly. Your system will be upgradable to the latest technology for at least a few years, and you'd be hard-pressed to find an application that demands more than your system can give. If all this sounds good, we suggest you take the leap.

Laurianne McLaughlin is a senior associate editor for PC World. ■

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Windows Utilities

Rx for Your PC

WARNING: Some utilities may be hazardous to your PC's health. Others are just what the doctor ordered.

By Dean Andrews, Harry McCracken, and Lincoln Spector

EVER NOTICE HOW computing can sound hazardous to your health? We talk of crashing, freezing, or even corrupting our FAT. Yecch. Which is why Windows utilities are like health care for your PC.

It starts with "healthy habits" utilities—programs that promote high-efficiency, low-stress computing. For example, keeping your files in good order with a file manager means that you won't need to reach for the Maalox next time you need that spreadsheet you created back in 1994. Or suppose you simply must save a couple dozen screen shots from the way-cool Web site you found last night. Avoid hard drive cramping by squashing those JPEGs down to size with a file zipper. And what about that IS guy who sends his reports in XyWrite? A handy file viewer will let you look at almost any file that comes your way.

But sometimes even the healthiest PC needs a good MD. Diagnostic programs are like general practitioners, giving your system an overall checkup and pinpointing potential problems. Disk scanners are radiologists, examining your hard drive for trouble. Uninstallers clean your system of old applications and orphaned DLLs; call them the internists. And disk defragmenters? ▶

inside the black bag

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The Doctors

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The Emergency Room

- Crash Prevention and Recovery 128

ILLUSTRATION: TIM BOWER

The shrinks of the PC world, they do their best to put your drive's scattered contents back in order.

Finally, there's the emergency room. When disaster strikes, crash recovery programs can help your computer get back on its feet.

But like doctors, all utilities aren't created equal. To separate the experts from the quacks, we reviewed 28 products—including Windows' built-in tools and two do-it-alls, Norton Utilities and Nuts & Bolts. The diagnosis? There are gems, but snake-oil salesmen still thrive.

Just as different HMOs offer different services, different operating systems offer varied utilities. In "The Future of Utilities," we take a look at those in Windows 98 and in a future version of Windows NT. And because any PC surgery carries risks, "Bad Medicine" warns of dangers these programs can present.

Dean Andrews is a regular contributor to PC World. *Harry McCracken is senior writer, Lincoln Spector is a contributing editor, and Shane Rau is a technical editor at* PC World.

online *Products with this icon can be downloaded from PC World Online's FileWorld (www.fileworld.com).*

best buys

IF YOU'D RATHER NOT BUY A SEPARATE file manager, disk scanner, and so on, go for a utilities suite. Of these, **Nuts & Bolts** sports a simple interface and file management tools. If you need more robust utilities—and better defragging and recovery—pick the slightly more expensive **Norton Utilities.**

● **FILE MANAGER** Mijenix's **PowerDesk Utilities 98** is everything Windows Explorer should have been, and more. You get the best of Explorer and the Windows 3.1 File Manager, plus encryption and file synchronization.

● **FILE COMPRESSOR** Mijenix's **ZipMagic** lets your zipped archives act like standard Windows folders, so you can use the files without unzipping them.

● **FILE VIEWER** There are many pluses in Inso's **Quick View Plus 4.5:** This easy-to-use upgrade to Windows' Quick View adds support for dozens of file formats. Built-in unzipping and other features help make oddball files easier to manage.

● **DIAGNOSTICS** Alas, no product stood out as a stand-alone diagnostic program. But if you want a good crash recovery utility, see "Crash Prevention and Recovery," below.

● **DISK SCANNER** The **Disk Minder** utility included in Nuts & Bolts (from Network Associates) is the best disk scanner around, repairing damaged files that the other products we tested couldn't. It's also the fastest of the bunch.

● **UNINSTALLER** The best overall performer in our tests was CyberMedia's **Uninstaller 4.51.** The program removes newly installed applications flawlessly, and its interface and documentation are easy to understand.

● **DEFRAGMENTER** **Speed Disk,** part of Symantec's Norton Utilities, is the fastest and best at defragmenting.

● **CRASH PREVENTION AND RECOVERY** With its familiar browserlike interface, CyberMedia's **First Aid 98 Deluxe** is the best crash recovery utility.

Healthy Habits

file managers

WHEN IT COMES TO managing files—copying, moving, sorting—Microsoft didn't make life easy: Windows Explorer, provided with Windows 95 and NT 4.0, is *less* powerful than Windows 3.1's File Manager in some respects. Fortunately, utility vendors have filled the file-management void. All of the file managers here let you copy, move, and juggle files more efficiently than does Windows Explorer. Some of them add file viewing, zipping, and other extras.

Drag and File Gold 4.17

PRO: Lots of file management tools, file transfer protocol feature, desktop toolbar.

CON: More expensive than Best Buy.

online What would Windows 3.1's File Manager look like if Microsoft had continued developing it? A lot like Canyon Software's excellent Drag and File Gold 4.17. Street-priced at $55, this handy utility restores vital features that Windows Explorer omitted, including a dual-window view and file filtering (letting you see, for instance, .bmp files only). You can also zip and unzip files, do FTP transfers across the Net, use a customizable toolbar to open drive windows and launch programs from the desktop, and synchronize two directories to ensure that they contain the same version of files (handy if you take work to and from the office). If you integrate the program with Win 95's Quick View or

ILLUSTRATION: TIM BOWER; PHOTOGRAPHS: KEN SMITH

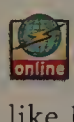
Canyon's own Drag and View, you get a built-in file viewer, too. If you don't need zipping tools, save $20 with the non-Gold version. Though it's a great program, Drag and File costs more than our Best Buy, PowerDesk Utilities 98—and if you plan to buy several utilities, every dollar counts. Canyon Software, 800/280-3691, www.canyonsw.com

READER SERVICE NO. 657

PowerDesk Utilities 98

PRO: Widest variety of features, including encryption and a disk-space gauge.

CON: Cluttered toolbar.



Mijenix's impressive PowerDesk Utilities 98 looks and works much like Drag and File Gold—only with a slightly larger lineup of tools, and for less money. Like that package, it restores features of Windows 3.1 File Manager missing from Win 95's Explorer, adds synchronization and zipped archive tools, and integrates with Inso's Quick View Plus. It also has built-in encryption and decryption, plus Size Manager, a bar graph of how much space folders use. Unfortunately, PowerDesk's customizable toolbar is crowded and unattractive. Still, at a street price of $40, this Best Buy is the most economical way to boost your productivity in Windows. Mijenix, 800/245-8000, www.mijenix.com

READER SERVICE NO. 658

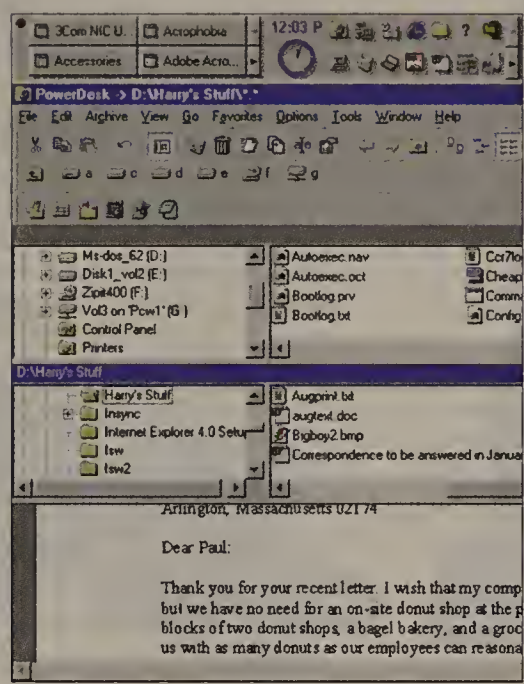
Turbo Browser 98 6.01

PRO: Built-in file viewing, graphics conversion, and batch processing.

CON: Can't display multiple folder views, no floating toolbar, pricey.

Though Pacific Gold Coast's Turbo Browser 98 6.01 substantially improves on Windows Explorer, it's costlier ($60 street price) and less intuitive than either Drag and File or PowerDesk. Turbo Browser provides plenty of useful file management features, including zipped archive tools and graphics conversion; it also offers the Qbar, a unique way to queue up batches of files for later zipping or unzipping, conversion, and viewing. Built-in filters handle the program's file viewer for a few formats, and the feature's compatibility with Microsoft's ActiveX enables it to display Office 97 files faithfully. Unlike the other file managers here, however, Turbo Browser assumes a high level of technical savvy. Pacific Gold Coast, 800/732-3002, www.turbobrowser.com

READER SERVICE NO. 659



Dual drive windows and a viewer pane are among PowerDesk's many improvements over Windows Explorer.

file compressors

IN A THOUGHTLESS BLOW TO JOE and Jane User, Microsoft didn't provide any way to work with compressed .zip files in Windows 95—essential for anyone who downloads from the Web, archives old files, or shuttles large files via e-mail or floppy. Though the basic zipping tools built into many file managers and viewers are okay for casual use, serious zipperheads require a stand-alone package. We tested each package's ability to zip and unzip files correctly (which all do) and paid special attention to its ease of use and installation.

EZip Wizard 2.0

PRO: Very simple wizard, free for unzipping.

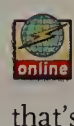
CON: Bare-bones features.

Unlike most of the competition, EdiSys's EZip Wizard 2.0 can't create self-extracting files or handle oddball compression formats such as TAR. All it does is zip and unzip files, with a plain-English wizard so utterly simple that WinZip and PKZip seem like brain surgery in comparison. A handy option lets you keep the wizard in front of other applications on your desktop so you can quickly leave another program to zip or unzip an archive. The shareware EZip, which can both zip and unzip, costs $29.95 to register; if you relinquish the power to zip, it's free forever. EdiSys, 888/334-7971, www.edisys.com

MicroHelp Zip 1.1

PRO: Familiar Explorer-style interface.

CON: No wizard, few features beyond the basics.



Take Windows Explorer and add an extra pane for zipped archives—that's Luckman Interactive's $30 MicroHelp Zip 1.1 in a nutshell. This inexpensive utility is simple to learn: Just drag files back and forth between the zipping pane and the folder view to compress or decompress them. It also has a few nice capabilities that Explorer lacks, including filtering and a customizable toolbar. But while MicroHelp Zip does the basics well, it's short on distinctive features: It offers nothing to rival WinZip's autoinstall feature, Zip-It's browser integration, or ZipMagic's integrated file viewing. Luckman Interactive, 800/711-2676, www.luckman.com

READER SERVICE NO. 660

PKZip 2.60 for Windows

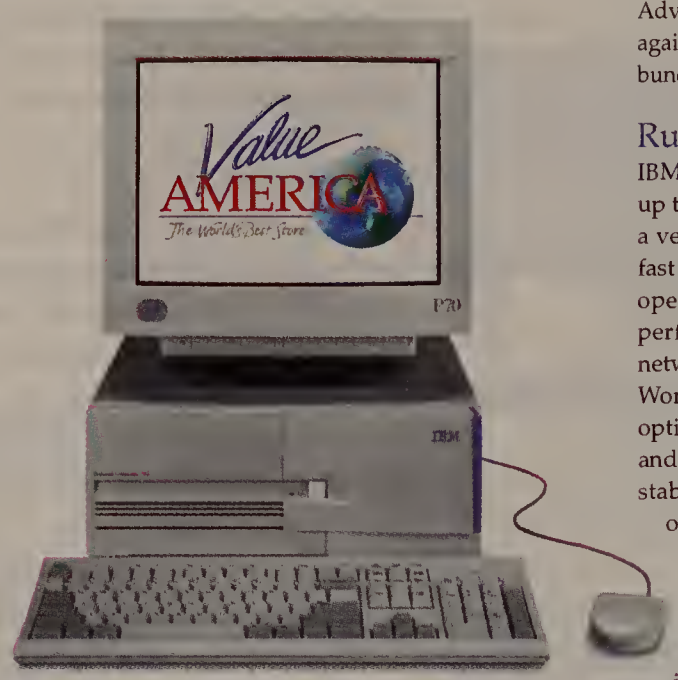
PRO: Decent wizard, includes advanced features.

CON: Clunky user interface, expensive.

The original .zip file utility still gets the job done, but it lacks the conveniences of our Best Buy, ZipMagic, and its closest rival, WinZip. To its credit, PKZip 2.60 has a straightforward wizard, and its standard interface provides lots of advanced tools (you can open files from various compression formats, for example). But since it has no viewing ability or tools for quickly installing an application from zipped files or looking at files within an archive, PKZip takes more steps than the best packages to put an unzipped archive to work. And at a street price of $49, PKZip is the most expensive zip utility here. PKware, 414/354-8699, www.pkware.com

READER SERVICE NO. 661

A Pentium Pro… At an Amateur Price



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- Windows 95, Lotus Smart Suite

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The Future of Utilities: Windows 98 and Windows NT 5.0

WINDOWS 95 comes with basic system utilities. Will Windows 98 or Windows NT 5.0 improve on them? We looked at prerelease versions of both and found that their disk scanning and file manipulation differ little from Windows 95's, but both add diagnostic and crash recovery tools. (As with all prerelease products, the lineup is subject to change.)

The two operating systems will have many tools in common. Their ScanDisk scanner will cover FAT16 and FAT32 disks, and NT will also cover NT File System, versions 4 and 5. As for file management, both OSs will offer Windows Explorer and Internet Explorer (depending on the Justice Department's actions), but neither will improve on Win 95's file management. For file viewing, Quick View will work as in Win 95. Win 98's updated Disk Defragmenter will organize your most-used files so that they load the fastest; NT 5.0's defragger isn't set yet.

The two OSs diverge in diagnostics, uninstalling, and crash tools. Win 98 will include the troubleshooting System Configuration Utility; the Version Conflict Manager, which prevents saving old files over new; and the System File Checker. Add/Remove Programs will remain, but Disk Cleanup will empty the Recycle Bin and Internet cache. Win 98 will also update Win 3.1's Dr. Watson diagnostics; the new Automatic Skip Driver Agent will watch for driver failures, and the Registry Checker will clean up the Registry.

NT 5.0 will integrate those functions into new core features. The Programs Wizard will centralize software installation to prevent conflicts and enable safe uninstalls, while the Hardware Wizard will configure hardware and fix bad device installations.

—Shane Rau

WinZip 6.3

PRO: Friendly interface, has both wizard and classic modes, lots of online help.

CON: Wizard doesn't zip files.

Whether you're new to the world of .zip files or an old pro, Nico Mak Computing's shareware favorite WinZip—now in version 6.3—is worth a test drive. The $29 utility's attractive interface and outstanding online help make it a pleasure to use, and its wizard automatically searches your system and provides you with a list of archives for unzipping. (Unlike the wizards of EZip Wizard and PKZip, however, WinZip's can't zip files.) The "classic" interface automatically senses archives containing applications and lets you install them with one click; you can also turn files in an archive into a Windows program group that your system will delete automatically when you're done with it. WinZip doesn't simplify working with archives as radically as ZipMagic does, but if you want a more traditional file decompression utility at a good price, it's a solid alternative. Nico Mak Computing, 800/242-4775, www.winzip.com

READER SERVICE NO. 662

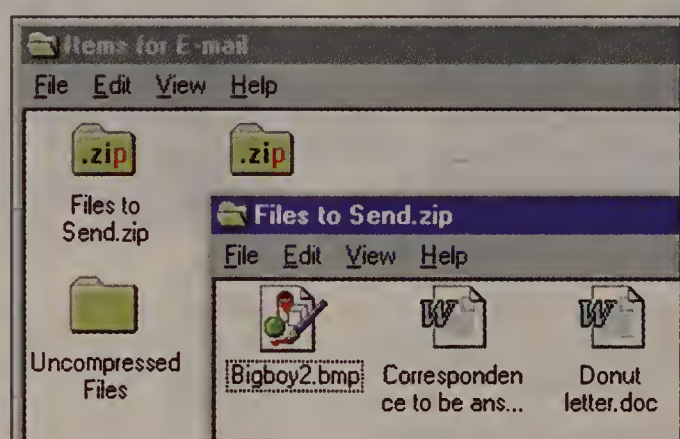
Zip-It 4.0

PRO: Includes browser plug-ins, can search for text within archives.

CON: No wizard, special features work only with Web sites that use Quarterdeck's server.

The Web is a prime source of zipped archives that need decompressing, and Quarterdeck's $40 Zip-It 4.0 has a Web-centric feel. It comes with plug-ins that let you unzip files from within the big two browsers without launching a separate program. Unfortunately, two of its most promising features (downloading .zip files from a Web site within Zip-It and selectively downloading and unzipping files within an archive across the Net) work only with the roughly 400 Web sites that use Quarterdeck's I-Zip server. Because the software lacks a wizard and uses dialog boxes jam-packed with technical options, it's better suited to advanced users than to neophytes. Aside from its Web features, Zip-It's a capable but undistinguished zip utility. Quarterdeck, 800/354-3222, www.quarterdeck.com

READER SERVICE NO. 663



ZipMagic's innovative technology turns zipped archives into standard folders you can open on Windows' desktop.

ZipMagic 1.0

PRO: Practically effortless zipping and unzipping, built-in file manager and viewer.

CON: Needs to be temporarily disabled in certain situations, incompatible with Windows NT.

Install Mijenix's ingenious ZipMagic 1.0, and you may forget you're using file compression. Our $40 Best Buy integrates itself so deeply into the operating system that zipped archives are virtually indistinguishable from standard folders. You can browse through them with Windows Explorer, launch applications without decompressing them, and even open and save zipped documents from within any program. ZipMagic also includes Archive Manager, a more traditional compression utility containing a viewer pane that integrates with Windows Quick View. ▶

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Circle 50 on reader service card

The only two drawbacks: It isn't compatible with Windows NT, and when you don't want .zip files to act like folders, you must momentarily disable the utility—but even that process is easily done from within most dialog boxes. Mijenix, 303/245-8000, www.mijenix.com

READER SERVICE NO. 664

file viewers

UNLESS YOUR COWORKERS and friends all use exactly the same applications you do, you'll find it worthwhile to invest in a file viewer. These stand-alone products go well beyond the bare-bones capabilities of Windows' Quick View utility, which can't handle newer formats such as Microsoft's own Office 97 files and has almost no extra capabilities (such as file compression). Third-party viewers allow you to view and print documents created in a wide variety of applications without having to load those programs.

Drag and View 4.0a

PRO: Inexpensive, with great image processing and conversion features.

CON: Doesn't retain formatting, doesn't unzip files, supports fewer file types than other packages.

If you're mainly interested in working with bit-mapped graphics files, Canyon Software's $35 Drag and View 4.0a is your best choice among file viewers. Like a full-fledged image editor, for example, it lets you adjust color and resolution. Otherwise, Drag and View lags behind all of its competitors: It can't identify files that lack the correct extension, and it displays unrecognized files as garbage or in alarming hexadecimal form. Drag and View also has trouble handling less popular word processing, spreadsheet, and database file types; and it displays those it does support as plain text. Canyon Software, 800/280-3691, www.canyonsw.com

READER SERVICE NO. 665

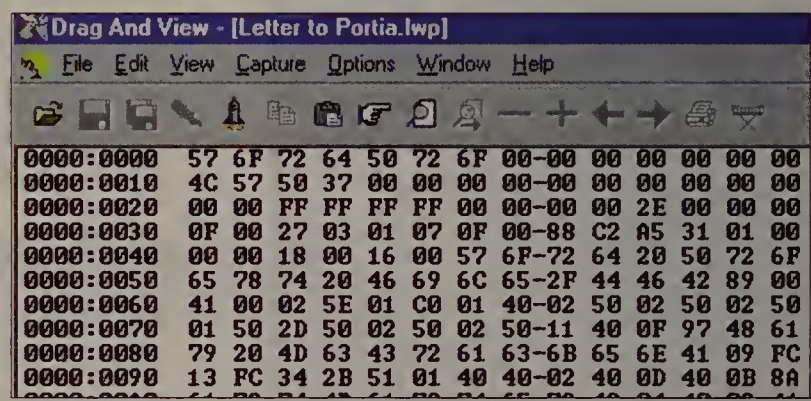
E-ttachment Opener 1.0

PRO: Converts file attachments, unzips files.

CON: Can't zoom the display or print out a file without launching the file's application first.

The good news: Your coworker finally e-mailed you that report. The bad news: It became a flood of garbage characters when you opened it. Time to call in DataViz's $40 E-ttachment Opener 1.0. This file viewer specializes in rescuing attachments that get turned into gobbledygook as a result of UUencode, BinHex, or MIME conversion: Just copy the garbage to the Clipboard, and E-ttachment Opener turns it into a viewable file. (Quick View Plus and KeyView Pro handle the same problem, but less elegantly.) Judged strictly as a file viewer, though, E-ttachment Opener is a mixed bag. Though it can unzip files and offers more file formats than Drag and View—including many for the Mac—it falls far short of Quick View Plus and KeyView Pro in recognizing arcane PC file types. And it can't zoom in to show you the display at different magnification levels or print a document without opening it first. Nevertheless, if your e-mail program is turning attachments into junk, E-ttachment Opener may well be worth considering. DataViz, 800/733-0030, www.dataviz.com

READER SERVICE NO. 666



Try to open a document that Drag and View doesn't recognize (one that lacks the correct extension, for example), and you may get a lengthy—and frightening—hexadecimal readout of the file's contents.

KeyView Pro 6.0

PRO: Supports many file types, converts various file formats, compresses and decompresses files.

CON: Can't display databases.

In many respects, Verity Software's KeyView Pro 6.0 gives Quick View Plus, our Best Buy, some pretty tough competition. Like that package, it's easy to use and supports more than 200 file types, and it does nearly as good a job of preserving documents' fonts and formatting. It goes beyond the basics, too, letting you compress and decompress files in various formats and convert word processing documents, spreadsheet files, and graphics files. Considering these extra features and its $40 street price, KeyView Pro would be neck-and-neck with Quick View Plus for Best Buy status if not for one glaring omission: It's the only viewer here that can't display databases. If you never, ever use database files and you want to save $9, KeyView is worth considering. But for a more complete package, stick with Quick View Plus, our Best Buy. Verity Software, 408/541-1500, www.keyview.com

READER SERVICE NO. 667

Quick View Plus 4.5

PRO: Easy to use, tight integration with Windows, supports a wide range of file formats, unzips files.

CON: Most expensive viewer, doesn't support Word Pro or PowerPoint 97.

As its name suggests, Inso's Quick View Plus 4.5 is a beefed-up version of the Quick View utility that's built into Windows 95. It's just as easy to use, and it adds more than 170 formats to Quick View's skimpy 30, including oldies like WordStar, newcomers such as Word 97, and some Macintosh types. Though no viewer displays every document perfectly, Quick View Plus does the best job of preserving fancy formatting, and it integrates into any program that works with Quick View. Our only complaint: The version we tested couldn't view Microsoft PowerPoint 97 or Lotus Word Pro files. (Inso was finishing up a PowerPoint filter at press time, and a Word Pro filter is available on Lotus's Web site.) At $49, it's also a bit expensive. These hitches aside, Quick View Plus's simplicity and file-format fluency make it our Best Buy. Inso, 800/733-5799, www.inso.com

READER SERVICE NO. 668 ▶

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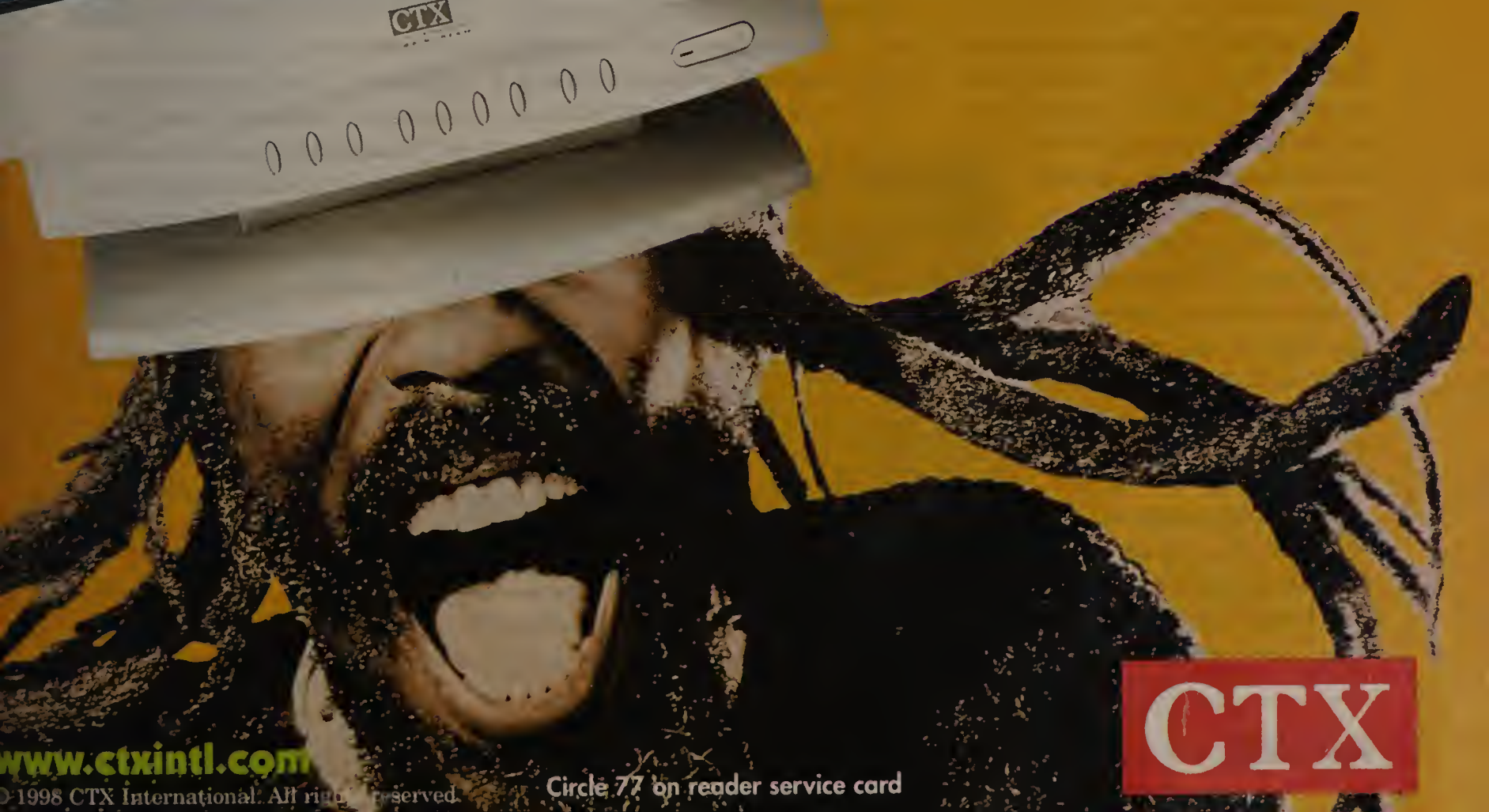

CTX

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Circle 77 on reader service card

The Doctors

diagnostics

UNLIKE DISK SCANNERS and defraggers, diagnostics utilities aren't essential—and that's a relief, because the programs we tested all failed to find, much less fix, problems with our computer. We looked at the diagnostic abilities of Norton Utilities and Nuts & Bolts, as well as two programs (BCM Diagnostics and CheckIt 5.0) that check only hardware, and two (First Aid 98 and RealHelp Extra Strength) that integrate hardware and software diagnostics. None did well enough to merit Best Buy status.

To evaluate hardware diagnostics, we came up with two entirely plausible problems. First we plugged in two conflicting sound cards. Then we installed a floppy drive with bent connector pins. During testing, we discovered an inadvertent third problem—our PC incorrectly thought a Zip drive was installed. To test each program's software-diagnosing skills, we created two Windows Registry errors: We hid an .exe file that Windows uses at start-up, and we botched the Registry entry for 1-2-3's map templates.

BCM Diagnostics

PRO: Quick, simple, inexpensive.

CON: Tends to crash, caught no problems.

This shareware Control Panel look-alike is fast, cheap (the registration fee is $25), and easy to use; but it's also limited. It froze when confronted with the two conflicting sound cards, and it deemed our damaged floppy drive simply 'not ready.' The same thing could be said of BCM Diagnostics. BCM Advanced Research, 800/753-0526, www.bcmgvc.com

CheckIt 5.0

PRO: Found one problem that most other programs missed.

CON: Failed to identify any of our test problems, confusing interface.

When you launch CheckIt 5.0, you'll probably see the message 'You Have a Problem.' Sadly, one problem is that you're using CheckIt. The $50 utility couldn't handle the sound-card conflict. And like every other program here, it saw the damaged A: drive as empty. To be fair, CheckIt found the missing Zip drive, but its recommendation wasn't very helpful. TouchStone Software, 714/969-7746, www.touchstonesoftware.com

READER SERVICE NO. 669

Discover Pro/Registry Wizard (Nuts & Bolts)

PRO: Less expensive than Norton Utilities.

CON: Missed every problem we tested.

In many areas, such as file handling, Nuts & Bolts beats Norton Utilities. But Nuts & Bolts's diagnostics tool, Discover Pro, is as inept as Norton Diagnostics at detecting hardware glitches. We also tried the package's Registry Wizard to see if it could find either software problem (both in the Registry); it found 79 "orphans" (Registry references to files, folders, and programs that aren't there), but none we had planted. If you need hard-core diagnostics, skip the $40 Nuts & Bolts. Network Associates, 408/988-3832, www.nai.com

READER SERVICE NO. 672

First Aid 98 Deluxe

PRO: Hardware and Windows diagnostics in one.

CON: Didn't find any of the test problems.

For $40, First Aid 98 Deluxe combines hardware and Windows diagnostics in one program with one Check-Up button. Too bad it missed all of our test problems. Like CheckIt, it did find the unintended Zip drive problem; unlike CheckIt, it suggested fixes. It doesn't test floppy drives but does discuss them in its hard-to-find knowledge base. Finally, it noted neither Registry error. CyberMedia, 800/721-7824, www.cybermedia.com

READER SERVICE NO. 670

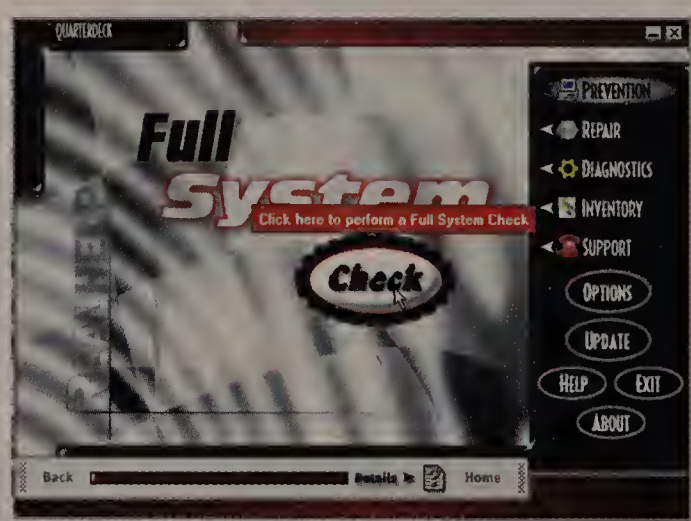
Norton Diagnostics/WinDoctor (Norton Utilities)

PRO: Found and fixed one Registry orphan.

CON: Very weak hardware diagnostics.

Norton Utilities includes separate hardware and software diagnostics tools. Norton Diagnostics (the hardware part) is a complete clunker; WinDoctor (software) is the best of a sorry lot. Norton Diagnostics failed to see our sound-card conflict and concluded that the misinstalled drive was empty. WinDoctor found and fixed the hidden .exe file but didn't notice our other Registry flaw. If you already own the package, stick with it, but don't pay $79 for its diagnostics alone. Symantec Corp., 800/441-7234, www.symantec.com

READER SERVICE NO. 671



Quarterdeck's RealHelp provides simple one-click access to a thorough diagnosis of your hardware and software. Too bad it couldn't identify all of our PC's problems.

RealHelp Extra Strength 1.0

PRO: Diagnoses hardware and Windows.

CON: Failed most of the tests.

Like First Aid, the $60 RealHelp Extra Strength 1.0 integrates hardware and Windows diagnostics.

ILLUSTRATIONS: TIM BOWER

Bad Medicine: Quirks to Watch For in Your Utilities

VENDORS MAKE broad claims about their utilities' abilities, but you won't often hear about their hazards. Uninstallers can be especially dangerous.

Their most difficult task is removing applications installed before the uninstaller. Quarterdeck's Remove-It 98 4.0 was a bit overzealous—particularly when, in the process of removing Excel, it deleted several shared Microsoft Office files, preventing Word from loading. Fortunately, Remove-It (like most others) provides a backup feature. In addition, Remove-It (like some others) shows you a list of the files it plans to remove. Cautious users will take advantage of both these features.

Uninstallers aren't the only risky utilities. During our crash recovery testing of RealHelp Extra Strength 1.0, we inserted the rescue disk. But the program asked for the volume label, as if it were password protected, and would not let us continue until we entered it. Caught by surprise, we had to get the volume label from another PC. The lesson? Test your rescue disks. You'll be sure they boot correctly, and you can discover unusual requirements in advance.

Bugs present another risk. First Aid 98 Deluxe, for example, had loading problems if installed after Internet Explorer 4.0 (a fix has been posted on the Web). Norton had difficulties with its Zip rescue feature (also patched online). And Nuts & Bolts has been plagued with glitches in its system maintenance utility (since fixed). If you find bugs in utility software, check the company's Web site for upgrades.

Unlike First Aid, RealHelp noted our sound-card and floppy problems. But it didn't offer workable solutions: It reported the damaged floppy drive as empty, and its Find-A-Fix knowledge base had nothing helpful to offer. It failed to see the missing Zip drive. Like Norton's WinDoctor, it fixed our hidden .exe file but missed the orphaned 1-2-3 folder. Quarterdeck, 800/683-6696, www.quarterdeck.com

READER SERVICE NO. 673

disk scanners

HARD DRIVES DEVELOP errors, both physical (on the surface of the disk) and logical (in the data itself). A good disk scanner should catch and correct problems of both sorts before they become serious. Ideally, you should perform a quick scan every day to check logical integrity, and a thorough scan every couple of weeks to check for scratches.

No major software company markets a stand-alone disk scanner, but Windows 95, Norton Utilities, and Nuts & Bolts all include scanners of their own. To pick the best, we created three common logical problems on a 2GB hard drive: a corrupted file allocation table (or FAT, which monitors available disk clusters and tracks the clusters that contain each file's data); lost or orphaned clusters (available clusters the FAT thinks are in use); and cross-linked files (two files the FAT thinks end in the same sequence of clusters). To test each package's ability to detect physical damage, we pricked a floppy disk with a pin and let the scanners try to salvage the data.

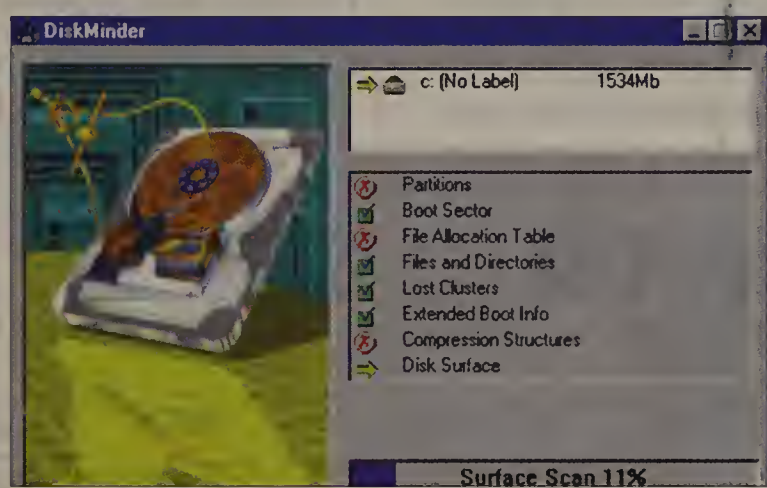
Disk Doctor (Norton Utilities)

PRO: Fast, includes undo feature.

CON: Couldn't save file in pinprick test.

Disk Doctor (part of Norton Utilities) did a good job with major problems, but other programs were better at surface scanning. On the plus side, it's easy to use (though it has goofy animation), fast (a quick scan took 16 seconds and a thorough scan under 6 minutes), and offers a reassuring undo feature. It found and fixed all our logical problems, but in our floppy pinprick test it didn't repair the damaged file and wouldn't let us copy it to the hard drive. It's a good tool, just not the best. Symantec, 800/441-7234, www.symantec.com

READER SERVICE NO. 671



Nuts & Bolts' Disk Minder races through your drive, finding and fixing errors. It does the best job of salvaging damaged files.

Disk Minder (Nuts & Bolts)

PRO: Best damaged-file repair, fastest.

CON: Insufficient reports.

Nuts & Bolts' Disk Minder is the best utility we found for scanning a hard drive. For one thing, it's the fastest: On the quick scan, Disk Minder took just over 7 seconds—9 faster than Norton's Disk Doctor, and 22 seconds ahead of Windows 95's ScanDisk. And like Disk Doctor, it offers an easy interface and an undo feature. Even better, it's the only disk scanner that passed our pinprick test, letting us copy a damaged file to our hard drive. Our only complaint: Though Disk Minder gives you a detailed error report, it's the only disk scanner that doesn't tell you which file is damaged. Otherwise, it's our fave. Network Associates, 408/988-3832, www.nai.com

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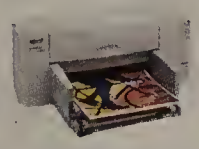

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ScanDisk (Windows 95)

PRO: The price is right.

CON: Very slow, no undo feature.

ScanDisk—the disk scanner included as part of Windows 3.x, Windows 95, and NT—is as slow as an eighteen-wheeler in rush-hour traffic. In our tests, a quick scan took just under 30 seconds, but a thorough scan took more than half an hour. You might as well head out for a bite to eat. Once ScanDisk is finished, however, its results are as good as Norton Disk Doctor's. And as with most disk scanners, this one is easy to use. It found every error and fixed them all (except for the pinpricked floppy, that is). Unfortunately, ScanDisk lacks the undo feature that other scanners include. If you're willing to spend a little money, you can do better. Microsoft Corp., 800/426-9400, www.microsoft.com

uninstallers

BECAUSE WINDOWS 95's Add/Remove Programs tool does such a spotty job of removing applications, and because installations can litter your hard drive and Windows Registry, you need a standalone uninstaller. These utilities, aside from removing unwanted applications, can also get rid of invalid Registry entries, obsolete Internet cache files, and other unnecessary junk. Because they can track the changes that new software makes to a hard disk, uninstallers are at their best when removing files that were installed after the uninstaller was added. In general, these utilities have a harder time removing previously installed software because they must guess which components to remove.

Our testing was simple: We asked the uninstaller programs to remove both preexisting and newly installed software. To determine the products' efficacy, we compared the number of files on the "cleaned-up" hard drive to the number on the drive before we installed any of the applications.

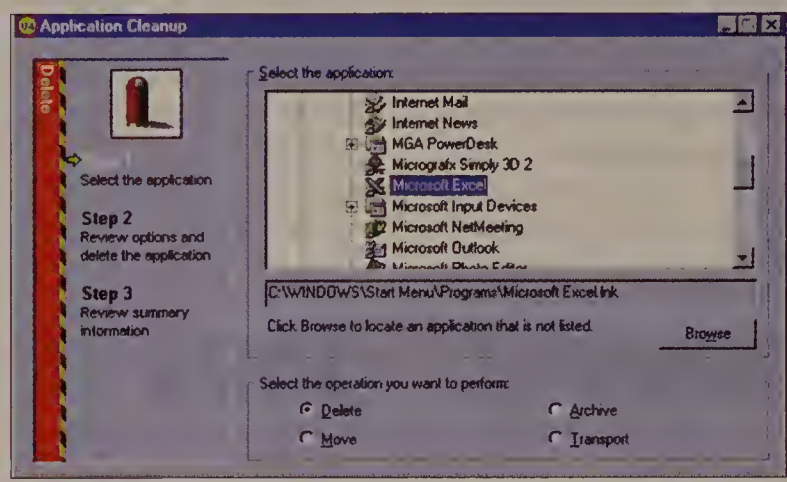
CleanSweep Extra Strength 4.0

PRO: Uninstalls well, removes Internet files, Registry Genie lets you edit the Windows Registry.

CON: Expensive.

CleanSweep Extra Strength ranks third in this crowd. It launches three background agent programs that remove unwanted Internet files, watch new installations, and monitor disk activity. Another tool deletes redundant DLL files, orphans, and duplicate files, while Registry Genie explains what different Registry entries mean. Though the $60 CleanSweep is powerful, it costs $20 more than our Best Buy, Uninstaller. Quarterdeck Corp., 800/354-3222, www.quarterdeck.com

READER SERVICE NO. 680



CyberMedia's **Uninstaller** lets you delete, move, or archive applications, or transport them to another computer.

Norton Uninstall Deluxe

PRO: Nice extra utilities, good reports.

CON: Removes fewer files than Uninstaller, can't perform multiple installations.

Symantec's $40 Norton Uninstall Deluxe removed fewer unneeded files than our two front-runners: It left 74 more files on our drive than were there originally; in comparison, CyberMedia's Uninstaller left 17, and PowerCleaner left 21. It also can't do multiple installations; it keeps a log of only your latest install. But the package does have useful tools for deleting unneeded files and invalid Registry entries, and for background-monitoring and graphically reporting disk usage. Symantec's Live Update offers program fixes and updates via the Web. Norton's documentation and interface are easy to use, but you'll get better performance for the same $40 with our Best Buy. Symantec Corp., 800/441-7234, www.symantec.com

READER SERVICE NO. 677

PowerCleaner 1.51 for Windows 95

PRO: Best with preinstalled apps, lets you modify list of files before it deletes them.

CON: No Internet updates, no automatic monitor for new installs.

Coming in a close second, Alpha's $30 PowerCleaner 1.51 did the best job of removing preinstalled applications, but wasn't as good with new installations. To monitor new applications, you must start the install process from within PowerCleaner; it has no background monitor. Still, the program lets you see and modify the list of intended deletions before it removes them. And you can delete, move, or archive files, or transfer them to another PC. Optimizers track and remove duplicate and orphan files. If you really need to save the $10, PowerCleaner is fine; otherwise, spring for Uninstaller. Alpha Software, 800/451-1018, www.alphasoftware.com

READER SERVICE NO. 676

Remove-It 98 4.0

PRO: Inexpensive, backs up apps before deletion.

CON: Deletes files that remaining apps need.

Though at $20 it is the cheapest uninstaller here, Remove-It 98 can be dangerous: When we asked it to delete Microsoft Excel, it also removed some shared Microsoft Office files, crippling Word. Fortunately, Remove-It backs up apps before removing them. Its interface is clean and simple, and a background monitor watches for new installations while you work. And its database includes the file extensions for over 1200 programs; Remove-It refers to these during application deletion. As a bonus, it also builds an emergency crash recovery disk. But it's a tad too aggressive for our tastes. Quarterdeck Corp., 800/354-3222, www.quarterdeck.com

READER SERVICE NO. 679

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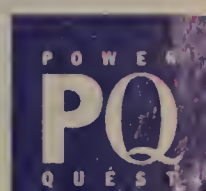


Uninstaller 4.51

PRO: Most effective with new apps, nice graphical reports.

CON: Less effective with preinstalled apps.

CyberMedia's $40 Uninstaller came closest to returning our hard disk to its original state, especially with new applications. It had a little more trouble with preinstalled ones. For example, when we tried to delete Excel, it deleted only Excel's Shortcut. Like other packages, it lets you delete, move, archive, and transfer apps to another PC, and its intuitive interface, documentation, and reports make it useful for all levels of users. Like a good cleanup crew, it's quick, thorough, and unobtrusive. CyberMedia, 310/581-4700, www.cybermedia.com

READER SERVICE NO. 675

WinDelete Deluxe

PRO: Finds applications from their Shortcuts, provides good graphical reports.

CON: Deletes fewer files than other programs, complicated interface.

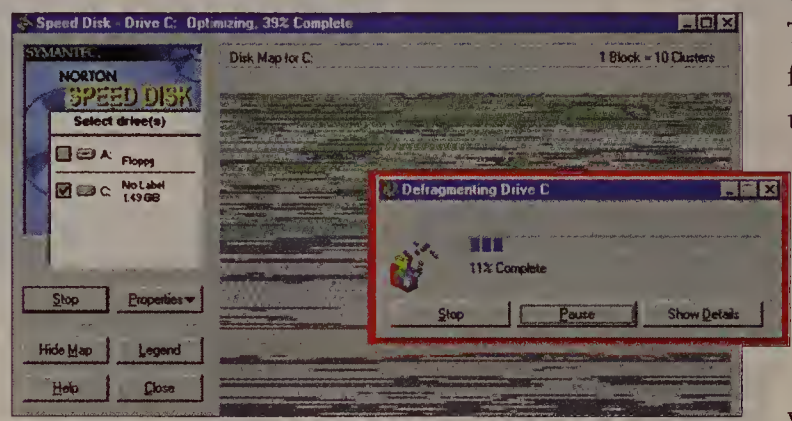
WinDelete Deluxe is clever at finding and deleting preinstalled applications—even if you only point it to the app's Shortcut—and it manages and clears unneeded Internet files, Registry debris, and duplicate files. But the $50 program's performance was otherwise middling (it left 107 more files than were there originally), and its interface (except for bar charts that map disk space) is complicated. IMSI offers free Web updates and agent programs, which monitor your work from the background. IMSI, 800/833-8082, www.imsisoft.com

READER SERVICE NO. 678

defragmenters

EVERY TIME YOU SAVE a file, Windows scatters it wherever hard drive space exists. Your files are then *fragmented*, and you need a defragmenter to bring them together. The benefits? Files open faster after defragging, and defragging can help restore a file after a crash. But don't expect it to improve overall speed: We ran PC WorldBench 98 and saw no appreciable improvement.

As with disk scanners, we tested the defragmenters that come with Norton Utilities, Nuts & Bolts, and Windows 95. To fragment our 2GB test drive, we used a batch file that copied, altered, and deleted files. Next we ran two speed tests. First, we unzipped a huge fragmented file; as we timed, we defragmented the drive and unzipped the file again. Second, we clocked the loading of a large TIFF file in Picture Publisher while running Word, 1-2-3, and Paradox; then we defragged and reloaded the file. Finally, to test each program's safety measures, we unplugged the PC while the programs ran, then rebooted and checked for damage. All passed this test.



Norton's Speed Disk displays a colorful map of your drive, but Windows' own Disk Defragmenter (inset) cuts to the chase.

Disk Defragmenter (Windows 95)

PRO: Simple, comes with Windows 95.

CON: Slow run time.

Disk Defragmenter isn't fancy. Instead of a colorful map, for example, it shows a simple progress bar. But it gets the job done—slowly. It took 87 minutes to defrag a 2GB drive with 342MB of free space; with only 96MB of free space, it took 122 minutes. Disk Defragmenter also left our drive 1 percent fragmented—not a big problem, but it should have done a complete job (as the others did). In speed tests, it performed as well as the others on the .zip file test and ahead of Nuts & Bolts on the TIFF load test. You can't beat its price, but you're better off spending a little to get better performance. Microsoft Corp., 800/426-9400, www.microsoft.com

DiskTune (Nuts & Bolts)

PRO: Best interface.

CON: Slow.

Nuts & Bolts' DiskTune looks great—even better than the Norton Utilities defragger— as it does its work. And like Norton, it does lots of fancy sorting tricks that the vendor claims improve performance (we disagree). But the attractive interface and sophisticated sorting methods don't compensate for DiskTune's comparatively poor performance. On our TIFF test, the utility performed worse than Windows' free defragger. And DiskTune took almost 37 minutes to run when the disk wasn't very full, and nearly 103 minutes when space was limited. Since you probably won't want to sit and watch the pretty colors for that long, DiskTune's good looks eventually become irrelevant. Network Associates, 408/988-3832, www.nai.com

READER SERVICE NO. 672

Speed Disk (Norton Utilities)

PRO: Very fast, gives best results.

CON: No status bar.

Symantec calls the Norton Utilities defragmenting tool Speed Disk, and with good reason. Before defragging, it took our PC almost 9 seconds to open the TIFF file; after defragging, it took under 6 seconds—10 percent faster than with Disk Defragmenter and 15 percent faster than with Nuts & Bolts. The defragging process itself was speedy, too: Norton churned through a 2GB drive in 16 minutes and 25 seconds, less than half the time of its closest competitor. Like the other two defraggers, Speed Disk is easy to use (too bad it doesn't tell you how close it is to finishing the job). It also performs several putatively speed-enhancing tricks (such as sorting files by date and moving the ones used most recently up front), but in reality none will noticeably speed up your work. Still, its combination of efficiency, speed, and ease make Speed Disk our top choice. Symantec, 800/441-7234, www.symantec.com

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Circle 191 on reader service card

The Emergency Room

crash prevention and recovery

NOTHING MAKES YOU feel as helpless as a system crash. Unlike a freeze, from which you can recover by closing the app or (at worst) rebooting, a crash damages your PC in ways that rebooting can't fix. Fortunately, most crash recovery utilities can reunite you with your data. In fact, all those we tested dealt successfully with lost or damaged clusters, cross-linked files, and a corrupted FAT.

Many of these products also claim to take preventive measures. By performing regular system checkups, they can correct software conflicts and warn you about potential crashes. Because many of the programs that do diagnostics also do crash recovery, we rereviewed them, looking specifically at how well they handled emergencies.

First Aid 98 Deluxe

PRO: Easy interface, clear description of problems and solutions.

CON: Somewhat limited disk recovery features.

First Aid 98 Deluxe has the best interface here, a key reason it's our Best Buy. The $40 utility's controls look and act just like a browser's. Its system checkup provides clear descriptions of problems and their solutions. Recovery tools are limited to Win 95's ScanDisk and Disk Defragmenter, but the interface makes them more usable. You also get a year of complimentary Oil Change service, which updates First Aid automatically over the Internet—handy for getting new crash recovery features. CyberMedia, 800/721-7824, www.cybermedia.com

READER SERVICE NO. 670

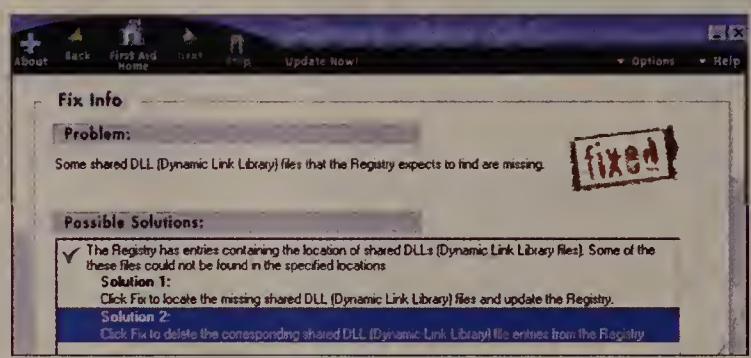
Norton CrashGuard Deluxe

PRO: Creates three powerful rescue disks, includes video clips with useful how-to tips.

CON: Complexity might overwhelm novice users.

Power users will marvel at Norton CrashGuard Deluxe's tools. The $50 package's three rescue disks claim to manage any crash situation, but the many options might intimidate some users. CrashGuard installs background agent programs that scout out potential freezes, viruses, and full disks. The antifreeze utility inserts itself in Windows' Close Programs dialog box and lets you restart hung programs before you lose data. Finally, the weekly error log can help you ferret out troublesome software. Symantec Corp., 800/441-7234, www.symantec.com

READER SERVICE NO. 683



First Aid 98 Deluxe identifies problems and suggests possible solutions. Its Fixed stamp means it has solved your problem.

Nuts & Bolts

PRO: Good recovery routine and system info.

CON: You must run all tools individually.

Nuts & Bolts has a good crash recovery procedure with a customizable rescue disk, a wizard that explains what's going on, and an undo feature. The program is also full of other handy tools, most related to disk cleaning: TrashGuard tracks deleted files, the ShortCut Wizard finds and removes (or fixes) orphaned Shortcuts, and the Cleanup Wizard removes seldom-used files from the drive. Unfortunately, Nuts & Bolts requires you to activate each of these routine individually. Network Associates, 408/988-3832, www.nai.com

READER SERVICE NO. 672

RealHelp Extra Strength 1.0

PRO: Good documentation.

CON: Poor rescue disk design.

A recovery tool is only as good as its rescue disk, and that's where the $60 RealHelp Extra Strength 1.0 fails. When you create its rescue disk, you must specify a volume label for the floppy. If you can't remember that label during recovery, the program grinds to a halt. Still, the well-designed documentation makes it easy to understand the product's many features. A helpful service manager monitors your system in the background. And like First Aid 98 Deluxe, RealHelp allows you to update the software directly over the Internet. Quarterdeck, 800/683-6696, www.quarterdeck.com

READER SERVICE NO. 682

VT Rescue 95

PRO: Least expensive.

CON: No crash prevention tools, spotty recovery.

We can't recommend VT Rescue 95. It has no crash prevention tools and it nearly failed our recovery tests. Our first attempts to create a rescue disk froze the program. (A patch fixed the problem.) The $45 software's main screen simply invokes Windows 95's tools, such as ScanDisk and the Registry Editor. The few new tools include CleanMan, which tracks and removes unneeded files, and WizCrash, which attempts to reanimate frozen apps. In the end, VT Rescue 95 was more trouble than it was worth. VT Virtual Technology, 011/41/21/729 97 12, www.vtvirtual.com

READER SERVICE NO. 684 ■

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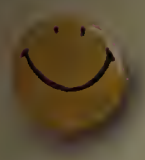

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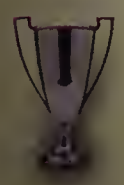

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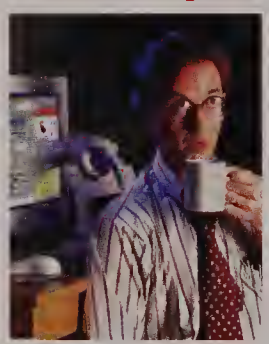

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Windows Magazine, 8/97

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Compaq	Good
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Micron	
Acer	Fair
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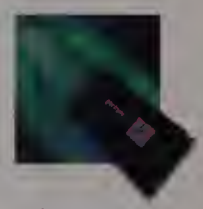

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- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
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Dear Reader:

Wait, stop. Before you delete this message, read on. If you're like us, you probably have a hundred or more unread e-mails in your in-box. Not only do your coworkers, clients, friends, and family pelt you with messages, they expect you to reply.

Can you read hundreds of messages a day and still get any work done? No way. You need help sorting high-priority mail ('Let's talk about that raise') from the junk ('Make $$$ Working From Home!'). Is your in-box full of mystifying ▶

ILLUSTRATIONS BY PETER COATES

file attachments? We have clues for deciphering them. Want to switch to a better mail program? We can help you take your old address book and messages with you. And that's only the beginning.

To keep you from going postal, we've sorted out the hottest tips for today's leading mail applications. We explain how to master America Online's proprietary mail system, as well as Internet mail programs such as Microsoft's Outlook Express and Internet Mail, Netscape's Messenger and Mail, and Qualcomm's Eudora Pro. We also provide basic pointers to demystify any e-mail package, including LAN-based systems (see "General Delivery").

Since no mail program has it all, we've listed the best e-mail add-ons ("Mail Tools That Rule") and video mail utilities ("You've Got Face Mail!"). Our guides to Internet mailing lists ("Get on the List") and Usenet newsgroups ("It's News to You") tap the brainpower of the digerati.

If you like what you see in this article, send us some mail. But please, don't respond to every contributor on the list. We wouldn't want you to get flamed.

BY SCOTT SPANBAUER

General Delivery

Empty That In-Box

Like toxic waste, the mail clogging your in-box won't go away by itself. Here are a few emergency cleanup tips for dispersing digital debris:

■ **Prioritize.** You can't deal with every message right now, but do scan subject lines as soon as you download your mail. You don't want to miss that last-minute departmental meeting. While you're scanning, ruthlessly delete junk mail and nonessential message threads. Some programs, including AOL and Outlook, let you download just the message headers, so you can perform this triage before you download a single message body.

■ **Reply quickly.** If replying to a message frees you to delete it and move on, do it. Remember: You hesitate, you get buried.

■ **Delete, delete, delete.** If a message doesn't contain information you'll need later (phone numbers, due dates, travel directions), nuke it. Or better still, set up your mail program to delete old messages automatically after a specified period of residence in your in-box—say, three months.

■ **File it.** You'll want to keep some mail around. But don't just abandon it in your in-box where you'll never find it again. Most programs allow you to create customized folders so you can sort your mail by topic or project. When the project's over, archive the folder or delete it.

Filter Out the Spam

Most e-mail programs let you set up filters to scan incoming messages, check them against your list of known junk mailers, and discard any matches. But you can also use filters to highlight mail you *do* want to read. Set up filters to sound an alarm when you receive e-mail marked "urgent" or a message from your boss. Or have this mail sent to a high-priority folder that you check throughout the day.

Reply Automatically

Want to acknowledge incoming mail without having to craft a reply? Create an automatic response. Using a filter that looks for certain addresses or subjects, you can reply automatically to some senders (clients) but not others (Mom).

Skip the Big Stuff

To avoid tying up your phone line and filling your hard disk, tell your mail program to skip messages or attachments larger than a certain size (1 megabyte, say, or 100 kilobytes if you really feel

Get on the List

LIKE THE human brain, e-mail is an underused organ. If you use your account only to stay in touch with coworkers, friends, and family, you're missing something great: mailing lists. Somewhere, a person or company maintains a list on a subject that's near and dear to you: Windows, Writing, Wonderbras, whatever. Though some mailing lists are more trouble than they're worth, especially when participants' banter drowns out the useful information, they're often the best way to stay current on a particular subject.

Most lists are public and let you join by sending subscription commands to the mailing list's server software, often through a Web page. Others are private and may require a human list moderator to approve your request. To find a list of interest, you should first check Liszt at www.liszt.com. In addition to a Yahoo-like directory of more than 89,000 lists, Liszt offers newsgroup and IRC chat channel directories—plus newcomer's guides to all three. Here are some basic survival tips:

Save those instructions. After you subscribe to a list, you'll usually receive an administrative message listing subscription options (including the all-important unsubscribe command) and how to reach the list moderator. Keep this message handy—you're going to need it.

Tame high-volume lists. Some popular subjects generate

strapped). Any program worth a damn will let you retrieve these large messages later when you have more time.

Stop Repeating Yourself

Never type anything (such as an oft-used e-mail address) twice. Let your mail program do the repeat typing for you.

■ **Remember your password.** If your PC resides somewhere fairly safe (if you lock your office at night or work at home), you can usually instruct your mail program to log in to your mail server automatically. Just remember, the office janitor will have access to your account.

■ **Populate your address book.** You want to send so-and-so a note responding to a query from last week, but you can't find the address. Next time, add the sender's name and e-mail address to your address book, so you won't have to hunt around for old messages in order to send mail.

■ **Make a list.** Do you often send messages to the same group of people? Create a mailing list (your program may call it a group or distribution list) containing their addresses so you don't have to type in each name every time.

■ **Sign off.** If you participate in an Internet mailing list or send mail to people outside your company, append a signature file (or sig) to outgoing messages. Be sure to include your name, title, address, phone, and e-mail address. To avoid violating the rules of Netiquette, keep sigs to four or five lines.

Do the Address Book Shuffle

Are you thinking about switching to a different mail program but having unexpected difficulty locating a way to convert your program's address book to the new program's format? Interguru's $20 shareware service on the Web (www.interguru.com/mailconv.htm) converts address book files to and from just about any format you may need, including Eudora Pro, Microsoft Outlook Express, and Netscape Messenger and Mail.

BY GLORIA HANSEN

America Online

Have an Identity Crisis

Do you use your AOL account for business *and* pleasure? If so, you can create a whole series of separate screen names (you can have up to five) for your working self, your after-hours persona, your spouse, your kids, and so on. Give the work address (*screen name*@aol.com) to business associates, and the personal address to friends and family. Log in as your business self, and you'll see only work-related mail. Log in after work using your personal screen name to stay in touch with the in-laws.

To create a new screen name in AOL 3.0, first log on. Select *Go To•Keyword*. Enter **names**, and a list of options will appear. Double-click *Create a Screen Name;* enter the name you want to use, the password, and the level of parental control; and click *OK*. To use the new screen name, log off and then back on using the new screen name (select it from the list in the Welcome window). To get rid of a screen name you no longer want, repeat the steps starting with *Go To* above, but this time double-click *Delete a Screen Name* instead of *Create a Screen Name.*

Automate AOL

Would you like your personal e-mail to be waiting for you when you get home? AOL can automatically log on to collect e-mail for one or more of your screen names. Select *Mail•Set Up FlashSession*. Click *Select Names* to select the screen name or names you want to automate, click *OK*, and click the *Schedule FlashSession* button. Check *Enable Scheduler*, select the start time and the frequency, and click *OK*. Remember to leave your computer on!

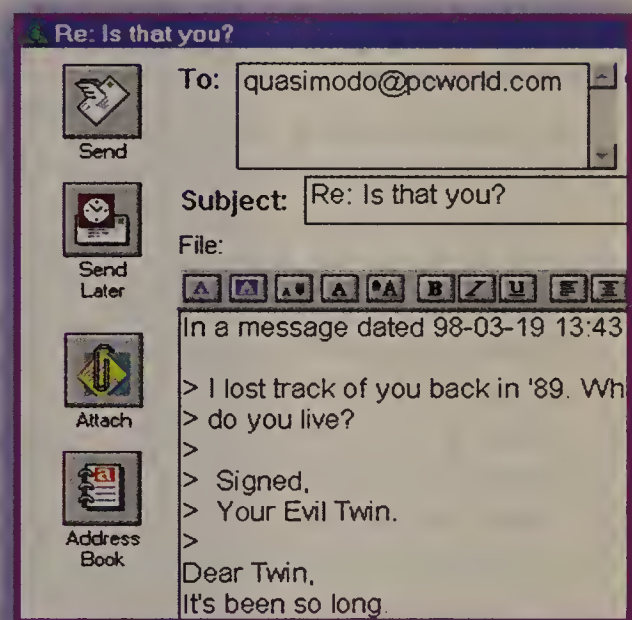

FIGURE 1: Blend in with Web cognoscenti by using Internet-style quoting in your AOL mail replies.

Use Internet-Style Quoting

Is that a *real* Internet account, or a Sears Internet account? If you want to match the coolness of other hip mail recipients on your mailing list or message thread, arrange for AOL to work the Internet way—by prefacing quoted lines with a greater-than symbol (see **FIGURE 1**). Select *Members•Preferences*, click the *Mail* button, uncheck *Use AOL style quoting in mail*, and click *OK*. To quote a particular portion of someone's message, you just open the e-mail, select the text that you want ▶

hundreds of messages a day. To deal with the deluge, you may want to direct incoming messages to a folder—or subscribe in digest mode, in which the day's messages are concatenated and sent as a single message.

Stop, look, and listen. Mailing lists are virtual communities. Before you post your manifesto, find out what the local customs are. And before you ask questions, find out if list members have already prepared a FAQ (frequently asked questions) file. The list server program may even be able to send it to you.

Spam-proof your posts. Spammers often lurk on lists in search of valid e-mail address to add to their databases. To avoid attracting junk mail, change your mail program's settings and your signature file so that your real address doesn't appear in your postings. For example, if your actual address is joe@isp.com, change it to joe at isp dot com or joeREMOVETHIS@isp.com. This will foil address-harvesting programs, though it won't baffle the human beings whose correspondence you welcome. —S. S.

to quote, and click *Reply*. The selected text will appear in quotation marks within the body of your reply e-mail.

Don't Print the Headers

Internet mail header information shows the return path, the host mailer, and other needless data. Here's how to save or print messages minus this useless stuff. Click anywhere inside the message field, and press **<Ctrl>-A** to select the entire text. Then click *Reply*, select whatever header information you don't want, and press **<Delete>**. To save more space, select the remaining text and click the *Reduce font size* button. Now print or save the message, and press **<Ctrl>-<F4>** to close the reply window. When AOL asks if you want to send it, click *No*.

Add a Hyperlink

Impress your friends by inserting a live hypertext Internet link into the midst of an otherwise standard e-mail message. By clicking on the link, the recipients of your mail (including people at non-AOL addresses) can go directly to the specified site. Select *Mail•Compose Mail*. While in the body of your letter, select *Go To•Favorite Places*. Choose the link you want to add to your message, and drag and drop it directly into your message window. You can also drag and drop a link from the Favorite Places folder located in your Personal Filing Cabinet.

Block Unwanted Mail

Tired of being flamed, spammed, and junked to death? Block nuisance e-mail from specific addresses (see **FIGURE 2**). Log on to AOL, select *Go To•Keyword*, enter **Mail Controls** in the keyword field, and click *Go*. Click the *Setup Mail Controls* button, check the screen name you want to shield from junk mail, and click the *Edit* button. Click the *Block mail from the addresses listed* radio button, enter all e-mail addresses you want to ignore in the *Type mail address here* box, click *Add*, and click *OK*. To block mail from an entire Internet domain (such as sickmail.com), simply enter the domain name.

Alternatively, you can first block *all* incoming mail, and then selectively ▶

Mail Tools That Rule

JUST BECAUSE you use an e-mail package doesn't mean you're stuck with its features—or lack of them. Anything e-mail software can do, a utility does better. Here are a few of our favorites. Except where noted, all work with any mail program.

E-ttachment Opener is DataViz's Swiss-army-knife viewer. It decodes almost any type of e-mail attachment and lets you view and print the contents. You can use it to view file names before decompressing them, and the E-Mail File Extractor can even recover the text soup of an encoded message. • **E-ttachment Opener**; $40; DataViz; 800/733-0030; www.dataviz.com

READER SERVICE NO. 666

MailJail lets Eudora and Outlook 97 users throw their spam in the slammer. MailJail's 400 filters look for telltale text and addresses that reek of spam; then the program deletes the malodorous mail or sends it to a folder. It also learns what you consider to be junk mail, based on the messages you delete. Download a free 30-day trial version. • **Mail Jail**; $29.95; Omron Advanced Systems; www.mailjail.com

READER SERVICE NO. 621

Whew is for anyone who has ever tried to locate an important phone number last seen in an e-mail from, say, December. If that's you, then you know how frustrating searching through e-mail archives can be.

Whew stores all of your saved e-mail messages in one file and indexes them for easy searching. It works with Microsoft's Internet Mail, Outlook, and Exchange; Netscape's Mail and Messenger; Lotus cc:Mail 8; and Qualcomm's Eudora 4.0. • **Whew**; $9.95; WordCruncher Publishing Technologies; 801/756-8833; www.wordcruncher.com

READER SERVICE NO. 622

MailStart.Com comes to your rescue if you're on the road and your notebook dies. How do you get your e-mail? Just borrow a PC with an Internet account and dial up MailStart.Com. This free service contacts your mail server and displays new messages as Web pages. It doesn't store messages or track what you've sent, but it's handy for sending and receiving mail in a pinch. • **MailStart.Com**; free; MailStart; www.mailstart.com

Encryption Plus helps you frustrate would-be e-mail snoops. Install the program, and enter the recipient's e-mail address and encryption code once; then send e-mail as usual. The outgoing message is protected by 56-bit DES encryption and is decrypted automatically when it reaches its destination. The catch? The software must be installed on the recipient's computer, too. • **Encryption Plus**; $39.95; PC Guardian; 800/288-8126; www.pcguardian.com

READER SERVICE NO. 623

Mail Spy solves the problem of how to monitor your e-mail for an important message without interrupting your work to check your in-box. Tell this free utility how often to look, and it will dial up your mail server in the background, check for new mail, and notify you when new messages arrive. • **Mail Spy**; free; SaberQuest; 801/235-1738; www.saberquest.com

AutoSpell automatically checks outgoing messages for spelling errors. It works with almost any e-mail program, as well as with WordPad and Notepad. It's perfect for people who hit the *Send* button a minute before realizing that they just typed *detail-orented*. • **AutoSpell**; $19.95; CompuBridge; www.spellchecker.com

READER SERVICE NO. 624

–Angela Freeman

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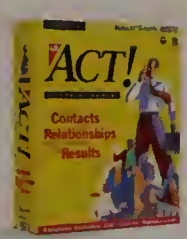

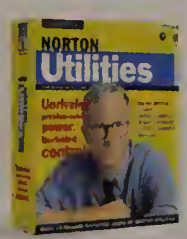

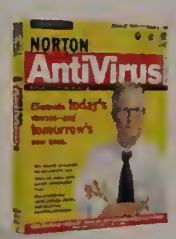

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Circle 232 on reader service card

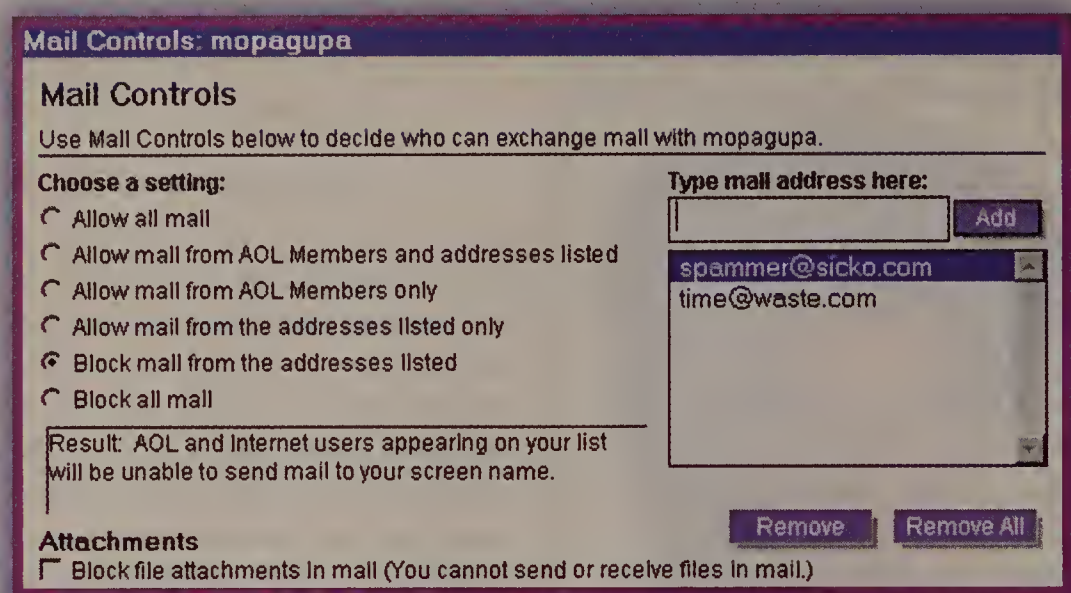

FIGURE 2: Hold junk mail at bay by blocking spammers' addresses from your AOL in-box.

unblock the path only for messages from individuals whose e-mail addresses you specify. In the Mail Controls window, click the *Block all mail* radio button, and click *OK*. To receive mail from particular individuals, click *Allow mail from the addresses listed only*, and enter the addresses you want to accept in the *Type mail address here* box.

Don't Download Junk Mail

Here's how to delete junk mail without downloading it first. Select *Mail•Set Up FlashSessions*, click *Select Names*, select the screen name or names you want to work with, enter the passwords, and click *OK*. Check *Retrieve unread mail*, and close the dialog box. Sign off, log on to AOL, and then click the *You Have Mail* button to display your new mail. Scan the e-mail sender and topic lines, select messages that exude the unmistakable odor of spam, and click *Ignore*. Next, select *Mail•Activate FlashSession Now*. Click the *Signoff when finished* button, and click *Begin*. AOL will collect your remaining mail and log off.

Back Up Your Address Book

Move to a new PC and your AOL address book may get left behind. The solution: Back up the files for easy copying. Open Windows' Explorer, create a new folder in the location of your choice (such as a floppy), and name it **AOL Backups**. Next, copy the files AddrBk.ind and AddrBk.lst from the \Aol30\idb folder to the AOL backups folder. To restore your address book, drag both files from your backup folder to the \Aol30\idb folder. And back up the contents of your Personal Filing Cabinet by copying the \Aol30\organize folder to your backup folder.

Quick, Take Back That E-Mail

Dispatching a flaming note can be cause for regret when your customary cool-headedness returns. If the recipient is on AOL and the mail hasn't been read yet, you still have hope. Select *Mail•Check Mail You've Sent*. Scroll down the list of mail sent, and click the e-mail you want to yank back from the jaws of receipt; then click the *Unsend* button.

Unslime the MIME

AOL's pretty good at encoding and decoding binary files attached to messages. But occasionally you'll open an attachment only to find it's gibberish. One way to solve the problem is to ask the sender to resend the file. If that's not possible or if the problem persists, try using the freeware utility Wincode (you can find it on PC World Online).

SPECTOR

BY LINCOLN

Microsoft Outlook Express and Internet Mail

Copy an Address

You're reading a message in the in-box's preview pane, and you want to copy and paste the sender's e-mail address into another program. This should be the easiest thing in the world to do. But the e-mail address is seldom displayed on screen—and even when it is, you can't select it for copying.

The solution is simple (see **FIGURE 3**): Press **<Ctrl>-R** to respond to the message. Select the address located inside the angle brackets (after 'From:' in the original message's header), press **<Ctrl>-C** to copy the address, and then press **<Alt>-<F4>** to close the response window.

Set Up a Mailing List

If you often send e-mail to the same group of people, set up a mailing list. In **Outlook Express**, select *Tools•Address Book* or press **<Ctrl>-<Shift>-B** (in **Internet Mail**, it's *File•Address Book*), and click the *New Group* icon. Enter a Group Name, and click *Select Members*. This will bring up a dialog box with two lists. Double-click a name on the left list to add it to your new mailing list on the right. When you're done with these selections, click *OK*.

Insert Bits of Boilerplate

Sometimes you have to send out the same snippet of text—a disclaimer, an explanation, or an apology—repeatedly. Instead of endlessly retyping it, insert some boilerplate text. First, use Notepad to create the boilerplate as a plain text file in a convenient folder. To put the boilerplate into a message in the New Message window of **Outlook Express**, select *Insert•Text from File* (in **Internet Mail**, it's *Insert•Text File*), and select the text file you want to insert.

Redirect Your Mail

Having a hard time slogging through your daily mail? Make some messages skip your in-box and go directly to a specific folder. In **Outlook Express**, select *Tools•In-box Assistant* (*Mail•In-box Assistant* in **Internet Mail**), and click *Add*. In the ▶

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PC MAGAZINE EDITORS' CHOICE

June 10, 1997
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Circle 141 on reader service card

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Properties dialog box, enter your criteria for selecting messages. Next, check *Move To*, click the *Folder* button next to it, select a folder, and click *OK* three times.

Mail Files From Applications

Want to fire off a copy of your spreadsheet to the boss? Don't go the long route of saving the file, opening your mail program, and creating an attachment. Word, Excel, and other applications have a Send command for e-mailing the currently open document. Regrettably, the apps default to using Windows Messaging (formerly known as Exchange). You can make them use **Outlook Express** (but not **Internet Mail**)—at a price.

To do this, select *Tools•Options*. On the *General* tab, check *Make Outlook Express my default e-mail program*. Notice that the grayed-out suboption below it, *Make Outlook Express my default Simple MAPI client*, has now become activated. Check this setting, click *Yes* in the resulting warning screen, and finally click *OK*. To put the change into effect, exit and then reenter Windows.

Unfortunately, using this setting disables Exchange, Windows Messaging, and Outlook (not the Express version, but the one that comes with Office) for anything more than e-mail. You won't be able to use Outlook as a PIM or Exchange for faxing while this setting is on.

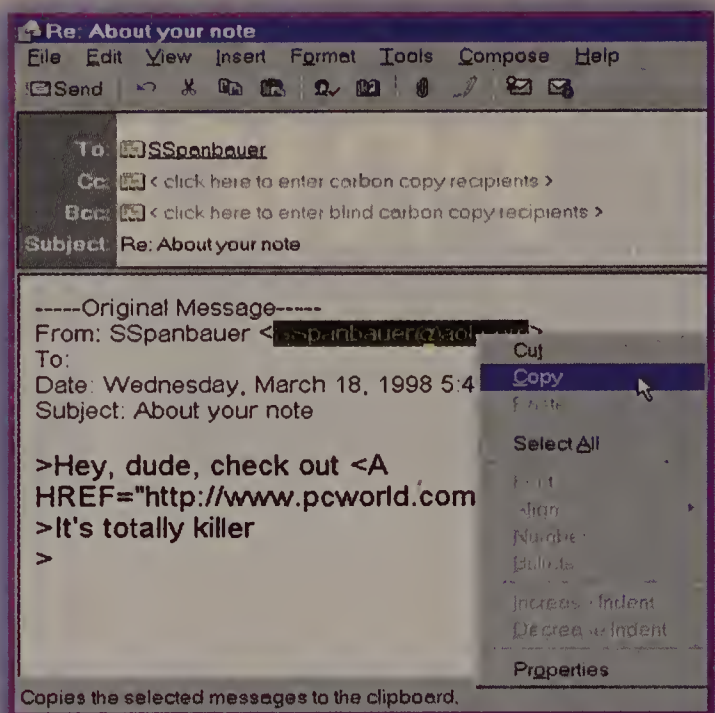


FIGURE 3: Outlook Express hides senders' mail addresses so well, you need to know a trick to copy and paste them.

Avoid Huge Downloads

Some people figure that, as long as they're sending you e-mail anyway, they may as well attach an .avi file of *Lawrence of Arabia*. Fortunately, you can skip those massive downloads.

In **Outlook Express**, select *Tools•In-box Assistant*, click *Add*, click *Larger than*, and type the maximum message size you're willing to accept. Check *Do not download from the server*, and click *OK* twice. In **Internet Mail** select *Mail•Options*. Click the *Server* tab and press the *Advanced Settings* button. Check *Do not download messages over*, and enter a maximum acceptable size in kilobytes. Click *OK* twice. ▶

It's News to You

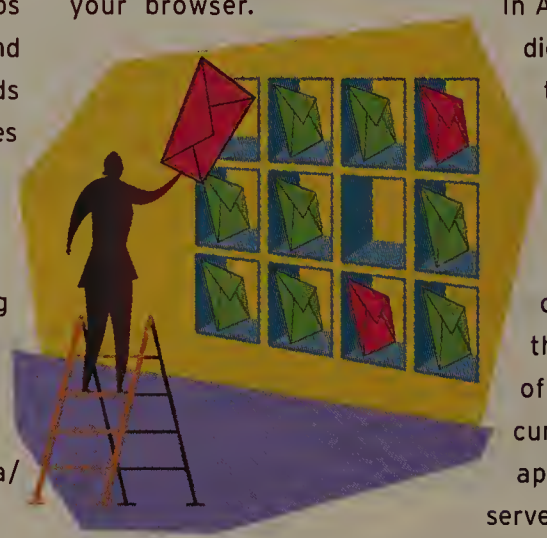
IF A SERIES OF e-mail messages is like a leisurely phone conversation, newsgroups are more like a conference call conducted from a biker-bar pay phone in the midst of late-night brawl. A lot of stuff is flying around, but filtering the useful information from the epithets and broken bottles isn't easy.

Once you learn the ropes, though, it's worth the effort. Thousands of public newsgroups focus on every imaginable topic (alt.bad.clams, and alt.spam.barf.barf.barf, to name two); and Microsoft, Symantec, Netscape, and other companies are setting up their own news servers to deliver tech support and service to customers. If you want to find out what other people think of a product you're about to purchase, check the company's news server or one of the uncensored Usenet public newsgroups.

Finding the list you want is the biggest challenge. The Liszt directory (www.liszt.com) is a good place to start. Your news reading program may also help. Outlook Express's Newsgroups dialog box makes it easy to find which of the many thousands of newsgroups your ISP carries contain particular words. If you read several high-volume newsgroups regularly, you'll want powerful tools for sorting the wheat from the chaff.

My favorite news reader is Forte's (free) Free Agent (www.forteinc.com/getfa/download.htm); it provides sophisticated controls for grabbing the messages I want and bypassing those I don't, including messages that are cross-posted to multiple newsgroups.

If you don't want to take the time to learn how to use and configure a newsreader, no problem. As with Web pages and ftp sites, you can get to a specific newsgroup in a flash simply by entering its URL in your browser.



For example, to jump to Symantec's general customer support group, you would type in the URL **news://service.symantec.com/symantec.customerservice.general** at your browser's address window and press **<Enter>**. If you don't know the URL of the newsgroup you want to browse, you can search for topics by using AltaVista or the amazing Deja News service.

In AltaVista (www.altavista.digital.com), just make sure that you choose *Usenet* from the Search drop-down list before you try clicking the search link. Deja News (www.dejanews.com) carries all news, all the time, though its index of messages may be less current than the messages appearing on your ISP's server. Deja News lets you post to newsgroups from any browser and tracks your personal news reading preferences—a great alternative to configuring your own news reader. **–S. S.**

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Circle 138 on reader service card

For a decade, MAG InnoVision has revolutionized the display industry by bringing you top-performance CRT-monitors. Now, we're proud to introduce the best in LCD monitors, with the LT500C (Active-Matrix) and LS500C (DSTN) pivoting displays.

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Say It With Text

Both **Outlook Express** and **Internet Mail** can send HTML-formatted messages—appendages that are unreadable by most humans. So make sure you send most of your messages as plain text (see **FIGURE 4**). In **Outlook Express,** select *Tools•Options* (in **Internet Mail**, *Mail•Options*). Click the *Send* tab. For the 'Mail sending format', select *Plain Text*. Click *OK*.

You can still send HTML to recipients who can read HTML mail. In an **Outlook Express** New Message window, simply select *Format•Rich Text (HTML)* (in **Internet Mail**, *Format•HTML*).

Banish the Bozos

Tired of getting mail from clowns? Reject it before it even gets to your in-box. In **Outlook Express**, select *Tools•In-box Assistant*, click *Add*, enter each bozo's e-mail address in the From field, and check *Delete off server*. Click *OK* twice to finish. In **Internet Mail**, select *Mail•In-box Assistant*, click *Add* and enter the address of each frizzy-haired correspondent in the From field. Go to the Move To drop-down menu and select *Deleted Items*. Click *OK* twice to finish.

Respond Automatically

You have so much incoming mail that you can't answer every message right away, but you want to do the polite thing and acknowledge each piece of mail you receive. Fortunately, **Outlook Express** (but not **Internet Mail,** alas) permits you to respond automatically to all or only certain incoming messages.

First, create your response text using Notepad or another text editor. Then select *Tools•In-box Assistant*, click *Add*, and enter the auto-response criteria. If you simply can't deal with your e-mail this week and you want everyone to know it, check *All messages*. In the bottom half of the box, check *Reply With*, then click the *Browse* button next to it to find and open your response message file. Click *OK* twice to finish.

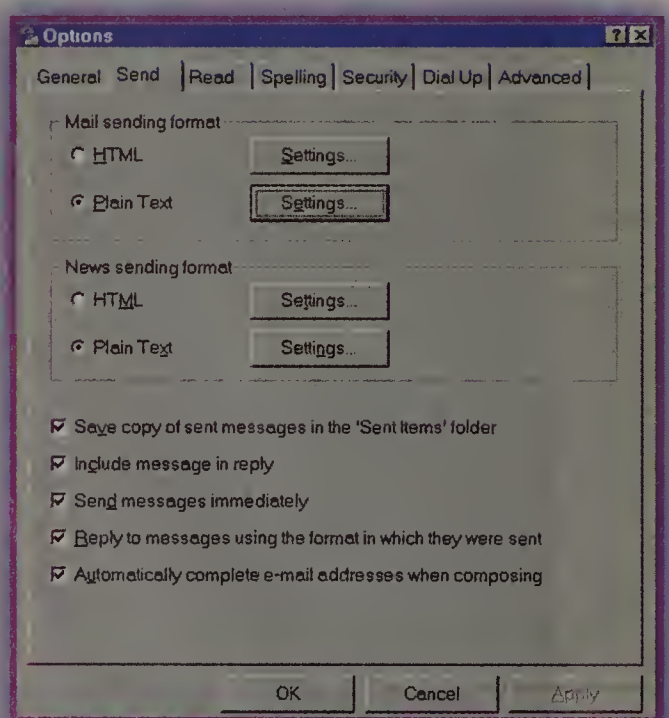

FIGURE 4: Spare your correspondents illegible HTML attachments by making plain text your default format.

BY JUDY HEIM

Netscape Messenger and Mail

Forget Your Password

Tired of typing in your password every time you send or receive e-mail? If you're not too concerned about the security of your account, you can automate the process (see **FIGURE 5**).

In **Messenger,** choose *Edit•Preferences*. Next, in the Category window under Mail & Groups, select the *Mail Server* branch, click the *More Options* button, and check *Remember my mail password*. Click *OK* twice to save the change. In **Mail**, select *Options•Mail and News Preferences*, click the *Organization* tab, check *Remember Mail Password*, and then click *OK*.

E-Mail From Applications

Wish you could mail documents directly from your applications? You can, with Messenger (but not Mail). To set **Messenger** as the default mail program with applications such as Microsoft Word that support Messaging Application Program Interface, choose *Edit•Preferences*. In the Category window under Mail & Groups, select the *Mail Server* branch, and click the *More Options* button. Check *Use Netscape Messenger from MAPI-based Applications*, and click OK. But beware: Messenger will take precedence over other MAPI-compliant mail programs installed on your system (such as Exchange, cc:Mail, or Eudora), and disable Outlook (see "Mail Files From Applications" on previous page).

Back Up Your Critical Files and Folders

After months or years of use, your address book becomes irreplaceable, and you'd like to include it in those quick backups of critical files—but where is it? In **Messenger,** the address book is a proprietary-format file called abook.nab in your user directory (the one probably identified as Program files/Netscape/Users/*yourname*, where *yourname* is your user name). While you're there, take time to back up the Mail folder, your preferences (prefs.js), and your bookmark file (bookmark.htm). You can also export abook.nab to an LDIF file that some mail programs can import (LDAP Data Interchange Format is a standard format for mail directories). To open the address book, press **<Ctrl>-<Shift>-2;** then choose *File•Save As*.

In **Mail**, you can back up the HTML-format address.htm file from the Program files/Netscape/Navigator folder. To export the file, choose *Window•Address Book;* then select *File•Save As*.

Create a Mailing List

If you frequently send mail to a select group of addresses, you should create a mailing list. In **Messenger**, access the ▶

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CTX

Circle 64 on reader service card

address book by pressing **<Ctrl>-<Shift>-2**. Click the *New List* icon, and give the list a name and—optionally—a nickname. Drag entries from your address book, or type in any valid Internet mail addresses, then click *OK*. In **Mail**, choose *Window•Address Book*, and then *Item•Add List*. Fill out the *Name* and the *Nick Name* fields (the latter is required due to a bug in Netscape Mail), and click *OK*. To populate the list, drag entries and drop them on the list.

To send a message in either program, press **<Ctrl>-<M>** and click the *Address* icon. Select the list's name in the address book, click the *To:* button, and click *OK*.

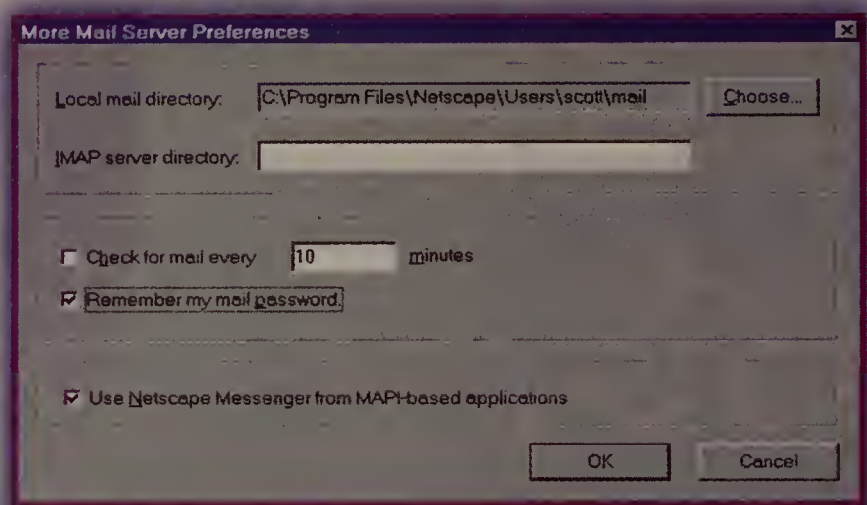

FIGURE 5: Messenger will remember your mail password for you, but you'll need to keep an eye on who has access to your computer.

Send HTML Where It's Welcome

Messenger (but not **Mail**) lets you send HTML-formatted messages with colorful fonts in different sizes. Some of your correspondents' mail programs won't be able to read the HTML formatting, though. To make sure everyone can read your messages, choose *Edit•Preferences*. Under the Mail & Groups branch, select *Messages*, click the *More Options* button, select *Always convert the message into plain text*, and then click *OK* twice. Next, open the address book (**<Ctrl>-<Shift>-2**), and right-click the address of someone who you are certain can receive HTML-formatted mail. Select *Card Properties*, check *Prefers to receive rich text (HTML) mail*, and click *OK*.

Create an E-Mail Signature

An e-mail signature may contain your name, title, phone and fax numbers, or a tedious quote (just keep it to four or five lines, out of courtesy). First, create the text in Notepad. Then in **Messenger**, choose *Edit•Preferences*. Under Mail & Groups, select *Identity*, type the path to the .txt file in the Signature File field, and click *OK*. In **Mail**, choose *Options•Mail and News Preferences*, select the *Identity* tab, enter the path to the .txt file in the Signature File field, and click *OK*. ▶

You've Got Face Mail

YOU ALREADY check e-mail and voice mail. Soon, you may add video mail to your itinerary.

Though these programs send the smallest clips your digital video camera pumps out, that's more than the average dial-up mail user can endure—about 2MB per minute of video. So reserve those talking head shots for recipients who connect via a LAN, ISDN, or T1 link.

BravoMail is geared toward workgroups and presentations and lets you add audio, video, and animated annotations to messages in any mail program that supports file attachments. The price covers a microphone as well. • **BravoMail;** $69.99; Softlink; 415/831-9270; www.bravomail.com

READER SERVICE NO. 625

CVideo-Mail lets you embed video into MAPI-compliant mailer messages or attach video files to messages in almost any other program. The purchase price includes a copy of Eudora Pro 4.0, a PCI video capture card, and a camcorder adapter. The optional Philips desktop camera costs another $100. You provide the microphone. • **CVideo-Mail;** $149; Cubic VideoComm; 888/295-0833; www. cvideomail.com

READER SERVICE NO. 626

LiveLetter lets you embed animations, video, and still captures from digital cameras or scanners in your Eudora and Netscape Mail messages. The program comes with assorted digital greeting cards. • **LiveLetter;** $39; Novita Communications; 408/588-1400; www.novita.com

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OnCamera Video Mail Kit includes a PCI video capture card, a Philips Desktop Color Camera with built-in mike, and software that you can use to create executable files that contain 2 minutes of video per megabyte. • **OnCamera Video Mail Kit;** $200; Tekram Technology; 800/556-6218; www.tekram.com

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SeeMail 3.0 for Business lets you send video mail or create customized letterhead containing a company logo or personal image. You can embed video in MAPI-compliant mailer messages or send it as an attachment. • **SeeMail 3.0 for Business;** $29.95; Realmedia; 303/442-4512; www.realmediainc.com

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Circle 7 on reader service card

BY STEVE BASS

Eudora Pro

Improve Eudora Performance

Are your In, Out, and Trash mailboxes filled to the brim? If so, your system is taking a big performance hit: An open, overflowing Eudora mailbox gobbles memory faster than a geek downloading porno GIFs. But you can cut through the clutter by creating some new mailboxes and transferring messages to them. Then keep open mailboxes to a minimum: Don't forget, the more mailboxes you have open, the more memory Eudora needs.

Deep-Six the Splash

Tired of watching Eudora's "splash" logo screen? Get rid of it. Close Eudora and use Win 95's Notepad to open your Eudora.ini file (you'll find it in the same directory as your Eudora.exe file—usually C:\Program Files\Eudora Pro. Under the [Settings] section, add a line with **NoSplashScreen=1** (or if the line exists, change the zero to **1**). Save your Eudora.ini file and restart Eudora. While you're fiddling with the Eudora's .ini file, you can also stifle the headers and footers when you print messages. Just add **PrintHeaders=0** to the [Settings] section.

Shift Gears on Your Keystrokes

Eudora offers you plenty of extra options via the <Shift> key. For example, if you hold down **<Shift>** while clicking the *New Message* icon you can select from the Personalities and Stationery options. Ditto for replying to and forwarding e-mail. When you're ready to queue a message for delivery, press **<Shift>** while you click the *Send* icon, and Eudora will give you the option of sending the message immediately, the next time your queued messages are sent, at some other time you specify, or not at all.

Remind Me? Remind You...

Want an e-mail reminder of your spouse's birthday—or the due date for a report? Eudora's built-in personal secretary will send you one (see **FIGURE 6**). Create a message and address it to yourself, but when you're ready to queue it, hold down **<Shift>** while clicking the *Send* button. Set the Send message delivery date for an appropriate time in the future. The message will sit patiently in your out-box until the specified day arrives.

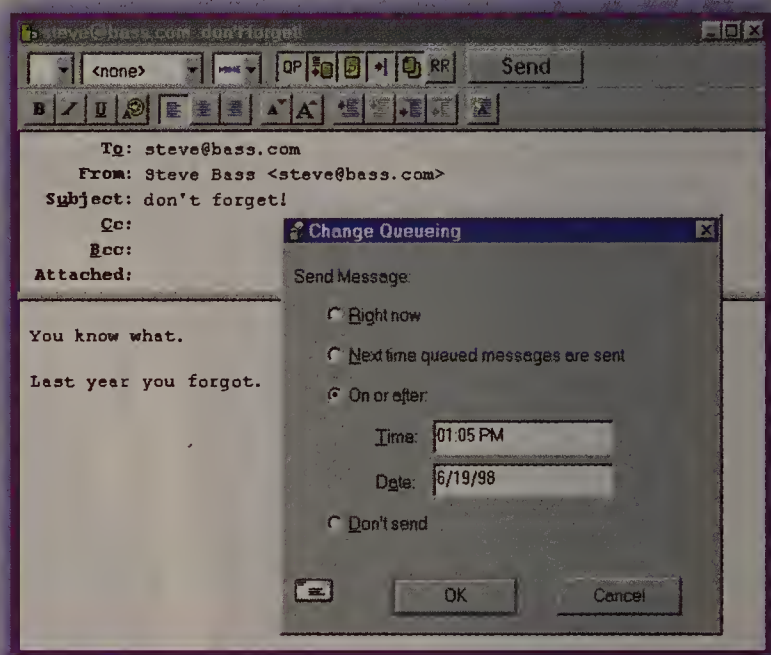

FIGURE 6: Afraid of missing an appointment or anniversary? Let Eudora send your future self a timely reminder of the event.

Make Room for the Message

Does a lengthy list of attachments or addresses crowd your screen when you create a new message? After you finish filling in the header information, just press **<F7>** or double-click the divider between the message and header areas. The header will disappear, giving you a bigger screen area for typing in the message. Press **<F7>** or double-click the divider again to bring the header back.

Fill In the Blanks

Can't remember exactly how to spell the name of someone in your address book? In the To field, type the first letter or two of the recipient's name, hold down **<Ctrl>**, and type a comma. Eudora will do its best to finish the name for you. Another way to make it easier on yourself is to add addresses you use regularly to the Recipient List. Press **<Ctrl>-L** or select *Tools•Address Book* to open the Address Book, right click a name and select *Add to Recipient List*. When you create a new message, right-click the To field and choose from the recipient list.

Here's What You Said

When you quote a previous message in a subsequent e-mail, it's helpful to note who the source was. Open your eudora.ini file, and add the line, **ReplyAttribution= Here's what you said..** to the end of the [Settings] section. Or get fancy and say, **At %1, %2, your nimble fingers typed..** Restart Eudora. The variable %1 will fill in the date of message being replied to, and %2 will fill in the sender of message

You can also put a special character in front of the quoted part of the message (the right angle bracket (>) is the most commonly used). It's easy: In the [Settings] section of your eudora.ini file, add **ReplyPrefix=**, and add the character after the equal sign (without a space).

The Keyboard to Eudora's Rescue

You're busily typing messages and have to attach a file, say, or run a quick spelling check. Here are some of the best finger-flicking shortcuts:

Attach a document	**<Ctrl>-<H>**
Check spelling	**<Ctrl>-<6>**
Open Address Book	**<Ctrl>-<L>**
Add sender to Address Book	**<Ctrl>-<K>**
Create a new message	**<Ctrl>-<N>**
Send message	**<Ctrl>-<E>**
Navigate Address Book tree	**<Up>, <Down>**

You can find files mentioned in this article at www.fileworld.com. Dave Hakala is a Denver-based technology writer. Gloria Hansen is a New Jersey–based freelance writer. Steve Bass, Judy Heim, and Lincoln Spector are contributing editors, Angela Freeman a staff editor, and Scott Spanbauer a senior associate editor for PC World. ■

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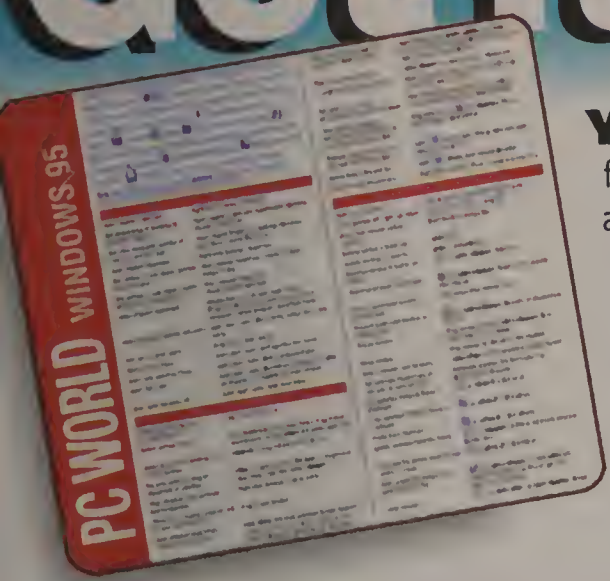

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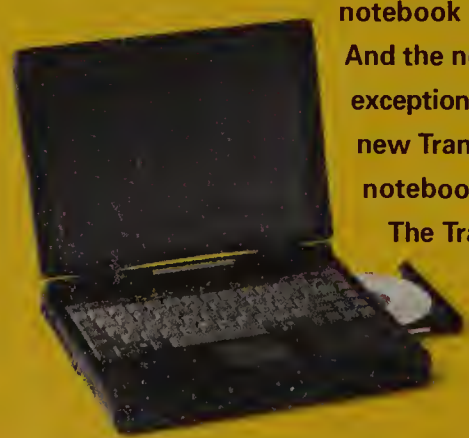

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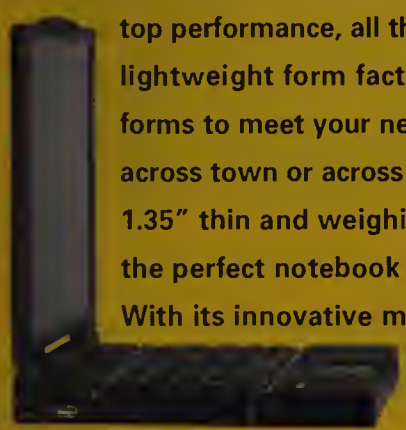

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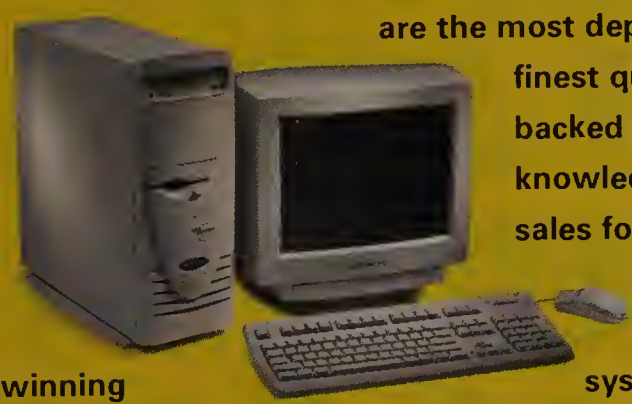

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Circle 139 on reader service card

Different Notes *for* Different Folks

PHOTOGRAPHY BY ERIK BUTLER

A multimedia monster to replace your desktop PC: Toshiba's Tecra 780DVD.

An ultralight travelmate that's kind to your shoulder: Mitsubishi's Amity CN.

Not all laptops are created equal. These 14 portables—desktop wannabes, outdoors survivalists, svelte traveling companions, and superlight tagalongs—will tackle any task. EDITED BY VINCE BIELSKI

UNDER A GLORIOUSLY blue afternoon sky, Jim Bruton waited anxiously at a rock-strewn base camp on Mount Everest. The documentary producer had been toiling in the thin air at 18,000 feet for two months in preparation for this moment. Now he was about to make history using his notebook computer.

At the top of Everest, where a team of climbers equipped with video cameras had just arrived, a Sherpa guide pointed his camera down the mountain and panned the surrounding peaks. The signal bounced off a satellite dish on a nearby mountain before the panoramic view materialized on Bruton's FieldWorks notebook, which then relayed the signal to its final destination, a Web site in Malaysia. "It was like seeing the first pictures from the moon," recalls Bruton about the first live video Internet broadcast from the summit of Mount Everest, which happened last year. ▶

It wouldn't have happened without the $8595 FieldWorks FW7666P. While other climbers' IBM ThinkPads succumbed to altitude sickness, the impervious FieldWorks stayed healthy. Even a soaking one night didn't hurt it. "When I woke up," recalls Bruton, "there was my computer sheathed in ice. I said, 'Oh my God, it won't work,' but it was fine."

THE NOTEBOOK BAZAAR

YOU MAY NEVER NEED an astronomically priced notebook that works at below-zero temperatures, but the existence of ruggedized portables like the FieldWorks speaks well of the wide variety of laptops available today. Product niches created for the sake of making a buck drive some of this diversification, but manufacturers are also wising up to the fact that one style of laptop doesn't fit all, says Ken Dulaney, a notebook analyst at Gartner Group. "These days most people have already owned a notebook for several years," he says, "and they have a good idea of what they want in their next one."

To help you find the best notebook for your particular needs, we divided the universe of portables into four categories: desktop alternatives, thin and light travel models, subnotebooks, and ruggedized units. We asked a wide variety of vendors to give us their best shot and send us a notebook that could win in one of our divisions. Once the entrants had rolled in, we used scoring criteria appropriate to each specific category, rather than our *Top 10 Notebooks* rating system.

DESKTOP KILLERS

FOR YEARS, notebook manufacturers have been claiming to have built a true desktop alternative—a portable PC with enough speed, keyboard, screen, and features to replace your office system. Truth is, notebook processors and screens have come close to matching those on desktop models, but you'll have to pay at least $3299—the price of the Pentium II-powered Quantex H 1331, our desktop alternative Best Buy—for a laptop and port replicator that provides most of the comforts of a full-size $2000 desktop.

You say you travel a lot? Your best bet may be one of the new thin and light notebooks. The older versions of these models lacked internal CD-ROM and floppy drives, but now you can buy a notebook that's only 1.5 inches thick, weighs 6.5 pounds, and comes with a modular drive bay. The best travel notebook we tested is the $3199 Gateway Solo 5100 LS.

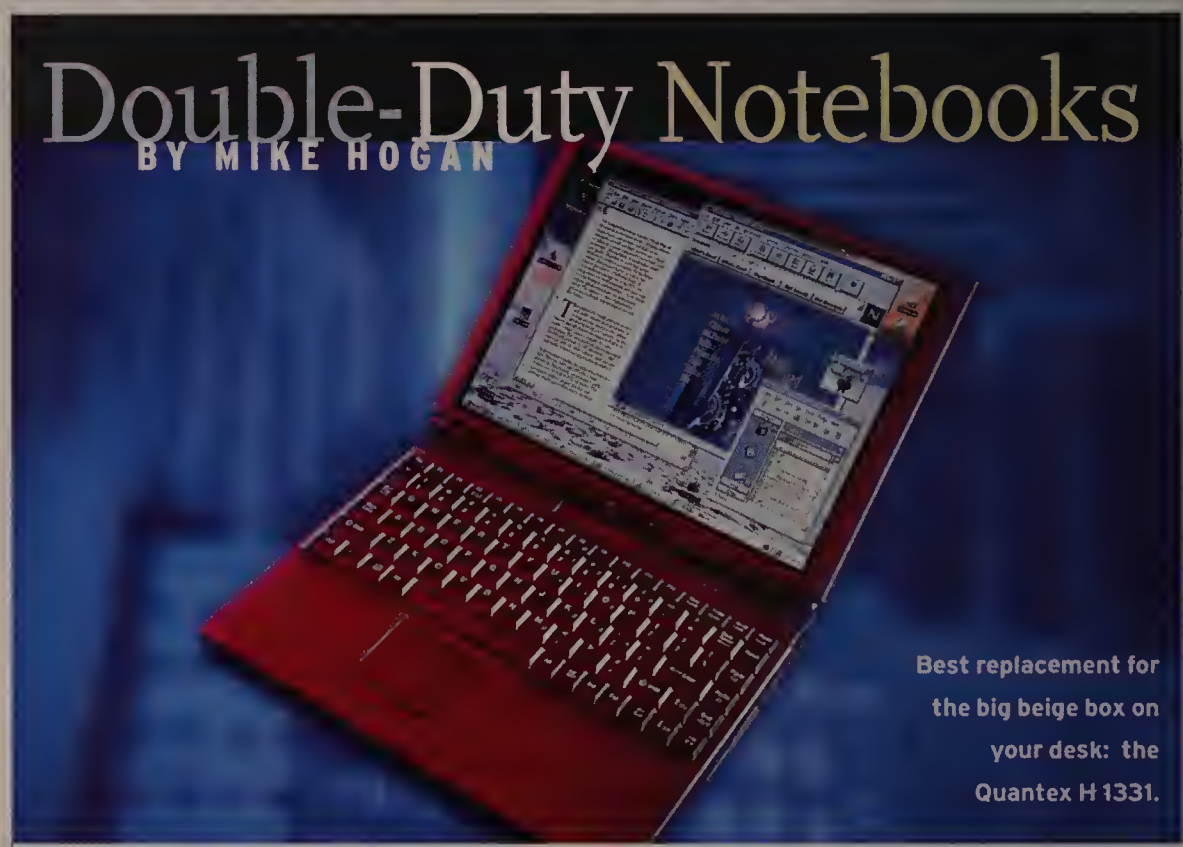
Need something even lighter—say, for e-mail and short bursts of word processing on the road? Four-pound subnotebooks, another niche product that some people prefer to the tiny palmtop devices, are attempting a comeback with faster processors and bigger screens. If your fingers can handle the subnotebooks' tiny keys and you don't mind the small screens, we recommend the $1999 Hitachi VisionBook Traveler 3000 for its bright screen and good performance.

Lastly, for those who need to take their office outdoors, a few vendors have introduced what you might call "ruggedized lite," a less heavily armored version of the shockproof and water-resistant portable. At about $4500, these units cost thousands less than fully ruggedized notebooks like the FieldWorks.

As you will see, specialization does not equal perfection—all of these notebooks have drawbacks. But the proliferation of choices is what we call progress.

Double-Duty Notebooks

BY MIKE HOGAN



Best replacement for the big beige box on your desk: the Quantex H 1331.

IF YOU'RE A BAD GUY hoping to hide a long rap sheet, try to avoid the Williamson County, Illinois, courtroom of Presiding Circuit Judge Ron Eckiss. Ditto for attorneys looking to bend the law. His honor has all that information at his fingertips thanks to a notebook he packs to court.

"My portable makes it easier for me to avoid mistakes," says Judge Eckiss.

Back at his office, a port replicator connected to a monitor, a keyboard, and the court's computer network sits on his desk. By plugging his notebook into the replicator, he gets all the comfort of a desktop PC but none of the inconvenience of swapping files between two computers.

A growing number of professionals who travel occasionally are opting for desktop alternatives, says Ken Dulaney, the Gartner Group analyst. But at what price? A Pentium II-266 notebook and port replicator, plus an external monitor and keyboard, will cost at least $4000. Why pay that much if you can get a desktop PC with the same CPU and monitor for $2000? "Most people who have notebooks work 3 to 5 hours a week more at home and on the road," says Dulaney, "so it's easy to justify the cost of a notebook."

In evaluating desktop alternatives from Compaq, Dell, IBM, Toshiba, and Quantex, we stressed price, performance, storage, screen, and port replicator or docking station. Weight and battery life were given less consideration because these note-

books are not intended for long trips.

After testing, we favored the Quantex H 1331. Its 266-MHz Pentium II processor and 4GB of storage make the H 1331 the equal of all but the newest desktops. At $3299, the Quantex is much cheaper than the other convertible models, and it's the only one in the group that comes with the attractive combination of an extra battery, a carrying case, and a port replicator.

The other desktop alternatives we tested had worthy features but couldn't compete with the Quantex's amazingly low price. (All prices here include docking station or port replicator.) The $6198 Compaq Armada 7792DMT and $6848 Toshiba Tecra 780DVD have bigger hard drives, more multimedia features, and more docking options than the Quantex. The $4323 IBM 380XD, the only portable in this group with fixed CD-ROM and floppy drives, was the sturdiest of the bunch. The $4348 Dell Latitude CP M233XT had the best battery life and an exceptionally well-balanced docking station.

POWER TO GET THE JOB DONE

IF A NOTEBOOK is going to be your one and only, consider a speedster. The fastest mobile CPU today, the Pentium II-266, powers the Quantex, IBM, and Toshiba units. With an average PC WorldBench score of 145, these notebooks are just as fast as PII-266 desktops we've tested.

But many users won't need that much speed—the PMMX-233 Dell and PMMX-266 Compaq can handle most tasks. And the Dell took top honors for battery life because its processor requires about 30 percent less juice than do Pentium IIs.

WANTED: QUICK GETAWAYS

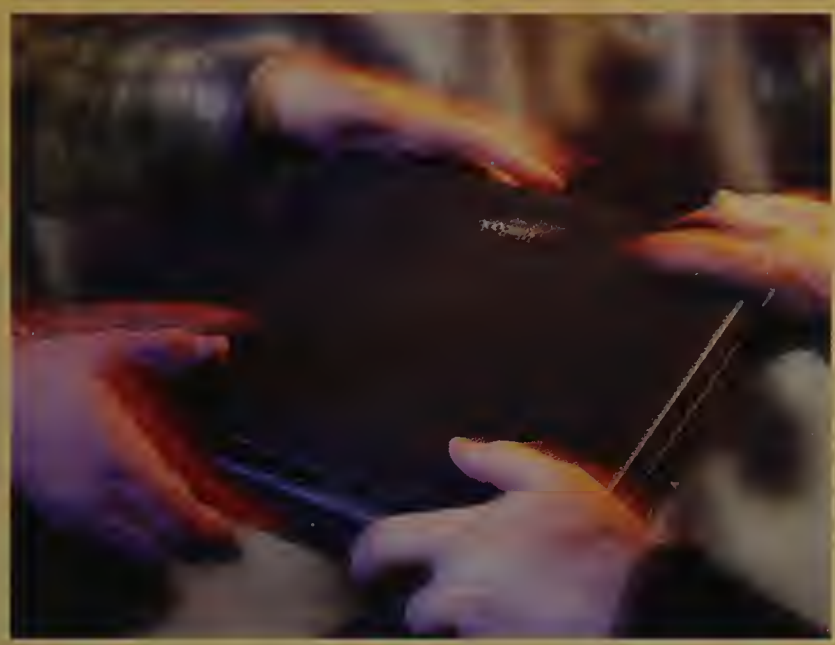
YOU SHOULDN'T have to bend over your desk and mess with a rat's nest of cables every time you want to hook up or disconnect your portable. A port replicator, or a more full-featured docking station, will save you the trouble.

Need to be networked? All five notebooks allow easy local area network connections. But the similarities end there.

We liked the minimalist approach of the Quantex Mini-Docking Station and IBM's $299 Enhanced Port Replicator. Each can connect to a monitor, keyboard, and mouse. These egg carton–size devices don't have a docking station's expandability, but the IBM does have PC Card slots.

Both devices can dock and undock only when the notebook is in suspend mode. Each tilts its notebook up at a comfortable typing angle, and both portables come with firm and large-enough keys—no need for an extra keyboard here.

If you need a full-featured docking station, Compaq's $863 ArmadaStation and Toshiba's $949 DeskStation V Plus will give you that and more. Besides a full array of ports, the ArmadaStation has a pair of PCI/ISA slots, a Type III PC ▶



Notebook Theft Is Skyrocketing: Here's How to Prevent It

YOU RUSH TO A PAY PHONE at O'Hare and set down your notebook to make an urgent call. Hovering nearby, the *spotter* sees you and signals the *distracter*, who approaches you and asks for change. Then the *pickup* comes up from behind you, grabs your notebook, and hands it off to the *courier* passing by.

Highly choreographed rip-offs occur daily. Ohio-based Safeware, an insurer specializing in computer coverage, says that 309,000 notebook PCs were stolen in 1997—up from 256,000 in 1996—and the upward trend is continuing.

The loss to businesses is not just in the cost of the notebook. The real damage comes from lost work hours and from the possible exposure of a company's business secrets. A 1998 survey by the San Francisco-based Computer Security Institute found that each stolen notebook costs companies an average of $32,000, not including the value of the lost data.

Most stolen notebooks are taken from offices by people with a reason to be there. "They're lifted by employees, messengers, and catering people," says Joe Mazza, a vice president at Datamation, a computer security company.

After you've left the office with your notebook, it remains a target for thieves—particularly at airports, where a tenth of notebook thefts occur. "Where else do you get 30,000 to 40,000 people a day who are hurried, excited, tired, distracted, and loaded with valuables?" says Lieutenant Dennis Luca of the San Jose (California) Police Department's Airport Division. "Talk about a pool of potential victims."

The best way to protect your laptop, experts agree, is simply to pay attention. "You don't leave your wallet or purse on your chair while you go get a cup of coffee, do you?" scolds Richard Bernes, a former FBI agent who now directs the Technology Theft Prevention Foundation in Warren, New Jersey. "But many do lose their portables this way." At phone booths and automated teller machines, as well as in restrooms, you should put your notebook bag between your feet or step through the strap.

A number of security devices can help you hang on to your notebook even when your guard is down. Cabling devices are the first line of defense. A cable attaches the computer, via a built-in security slot, to a stable object like a desk drawer handle, a table leg, or a chair. We recommend Qualtech's **Notebook-Kit**, an 8-ounce cable-and-lock combination that fits into a pocket-size pouch.

Our favorite alarm is **TrackIt**. You carry the key-chain transmitter and put the wallet-size receiver—which weighs less than 6 ounces—in your notebook case. When you and your notebook are separated, the alarm in the case goes off. In my test it was certainly loud enough to foil a thief. **—Carla King**

•**Qualtech Notebook-Kit**; $44; Curtis Computer Products; 800/272-2366; www.pcsecurity.com

READER SERVICE NO. 650

•**TrackIt**; $50; TrackIt; 888/487-2251; www.trackitcorp.com

READER SERVICE NO. 651

of

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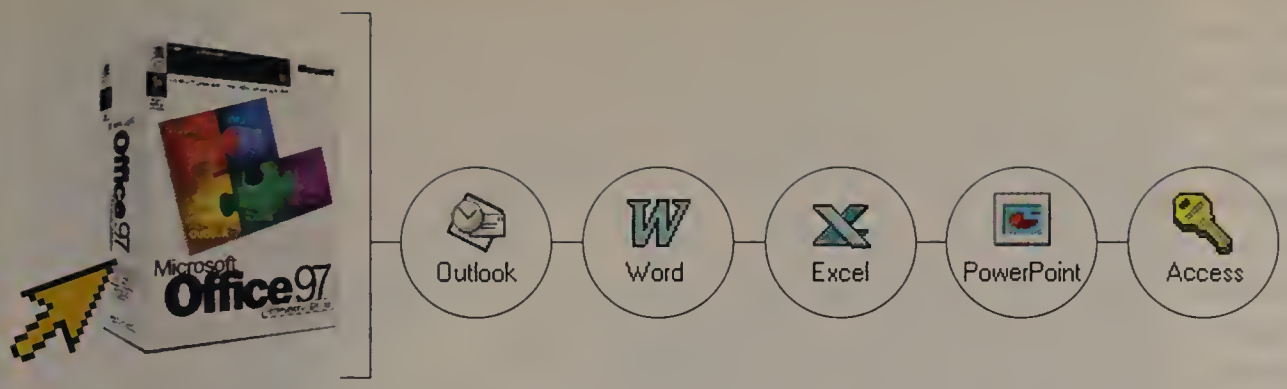

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Card slot, and a modular bay; the DeskStation V Plus has one more of each type of slot. Unfortunately, both are almost as large as a desktop PC. They put your notebook about as high off the desk as the pile of money they cost, and are designed for use with an external keyboard and mouse.

Dell's $649 C/Dock Expansion Station has the best balance of size and expandability. In addition to a PCI slot and a modular bay for a CD-ROM or floppy drive, the station includes a SCSI-2 port and 10/100Base-T network interface. And the Dell portable has an accurate touchpad and a crisp keyboard—altogether, a very comfortable setup.

The docking stations with the Compaq, Toshiba, and Dell can all "hot-dock" (accept a notebook that's already turned on). But Windows takes so long to set up the drivers that it's faster to dock with the notebook turned off, then fire it up again.

IT STILL HAS TO BE PORTABLE

EVEN AWAY from the office, a desktop alternative must hold its own as a computer. All of the portables here are equipped with bright, crisp active-matrix screens. The IBM has a 12.1-inch screen, and the rest measure 13.3 inches—or the equivalent of a 15-inch monitor.

Large screens need hefty batteries to keep them shining during an occasional foray. At 5.75 hours, the Dell ran the longest; the Quantex, at nearly 3 hours, was the shortest-lived, which is probably why the H 1331 comes with an extra battery. All the notebooks but the IBM can take a second battery in the modular bay.

The Quantex and Dell are the lightest of this bunch, weighing 7.4 pounds apiece, including AC adapter. The boxy IBM is 8 pounds, but its sharp edges make it uncomfortable to carry by hand. The 8.6-pound Compaq and 9-pound Toshiba are heavy enough that you might make excuses to leave them at the office.

IS IT WORTH IT?

NOTEBOOK, docking station, monitor, keyboard—the price adds up. But if you do hit the road occasionally, desktop alternatives can foster productive new ways to work such as desksharing and telecommuting.

Manny Sanchez, senior analyst at Houston's Shell Oil Products Company, says notebook users get more work done because they can pick the time and place to work and never lack needed files. "You always pay a premium for mobility," he adds, "but for some employees, it's a tool of the nineties they've just got to have."

• **Compaq Armada 7792DMT and Armada-Station;** $6198; Compaq; 800/345-1518; www.compaq.com

READER SERVICE NO. 804

• **Dell Latitude CP M233XT and C/Dock Expansion Station;** $4348; Dell; 800/338-8542; www.dell.com

READER SERVICE NO. 805

• **IBM 380XD and Enhanced Port Replicator;** $4323; IBM; 800/426-2968; www.pc.ibm.com

• **Quantex H 1331 and Mini-Docking Station;** $3299; Quantex; 800/346-6572; www.quantex.com

READER SERVICE NO. 806

• **Toshiba Tecra 780DVD and DeskStation V Plus;** $6848; Toshiba; 800/457-7777; www.csd.toshiba.com

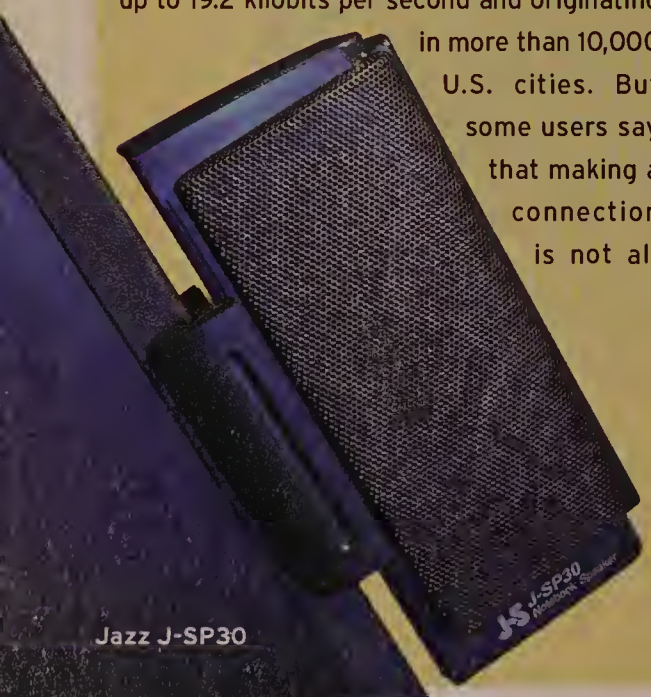
READER SERVICE NO. 807

The **Complete** Travel Package

Motorola Wireless Modem

Wireless Modem One of the pleasures of a wireless world is being able to get out of the office. Sitting on my front stoop with my notebook and Motorola's $427 **Personal Messenger PM 100D** wireless PC Card modem, I can easily send e-mail over Ardis, the largest wireless two-way network. For $49.95 a month, Ardis allows you unlimited communication at speeds up to 19.2 kilobits per second and originating in more than 10,000 U.S. cities. But some users say that making a connection is not always so easy.

• **Motorola Personal Messenger PM 100D;** Ardis; 800/494-1732; www.ardis.com READER SERVICE NO. 809



Jazz J-SP30

Speakers Face it: Notebook speakers sound lousy. If you're looking for beefier output that still travels light, try the $50 **Jazz J-SP30** speakers. Thanks to an artfully designed double-clip mounting system, the 6.5-inch-tall, 3-inch-wide speakers handily attach to the sides of a notebook's screen. These 1-pound speakers have no tone controls, but they sound so good that I didn't mind. An AC adapter or two AA batteries supply power. Your notebook must have an audio-out or headphone jack. • **J-SP30;** $50; Jazz; 626/336-2689; www.jazzspeakers.com

READER SERVICE NO. 810

Printer If you don't want to leave your hotel room just to print a document, consider packing the $299 **Canon BJC-80** bubble jet printer. Half the size of a laptop, the 3.9-pound printer provides sharp color and monochrome output, has infrared communication ports, and—get this—also functions as a 360-dots-per-inch color scanner if you buy an optional $99 cartridge.

• **BJC-80;** $299; Canon; 800/652-2666; www.ccsi.canon.com

READER SERVICE NO. 655

Solar Recharger Now you can take your notebook far into the boonies—if you stick the 2.4-pound **SunWize Portable Energy System**, a $350 solar-powered DC provider, where the sun shines. In my test under moderate late-afternoon sun, the thin 10.5-by-15.5-inch solar panel did a respectable job, recharging 20 percent of my notebook battery in 2 hours. The recharging time depends on the amount of light and the power your notebook requires.

• **Portable Energy System;** $350; SunWize Technologies; 800/817-6527; www.sunwize.com

READER SERVICE NO. 656

—Jon L. Jacobi

The Peripatetic Laptop

BY DAVID ENGLISH

Our choice for a full-featured yet light traveler: Gateway Solo 5100 LS.

JOHN FLORY TAKES a business trip about every six weeks, but he never travels alone. He packs his Gateway Liberty notebook into his briefcase almost everywhere he goes. For a recent conference in Florida, the New Jersey–based engineer carried his laptop back and forth between meetings and his hotel room. About the only time he wasn't toting the notebook was when he crawled into bed, exhausted, for the night.

"Shave 6 ounces off a notebook, and I'll be able to feel [the difference] by the end of the day," Flory says.

For most business travelers, the way to distinguish a good notebook from a bad one is easy: Pick it up. But until recently, choices in lightweight notebooks were limited. Most makers of the first generation of travel notebooks (such as Flory's Gateway Liberty or the popular IBM ThinkPad 560) reduced weight to about 5 pounds (including AC adapter) by leaving out internal CD-ROM and floppy drives.

Thanks to multilayer circuit boards, smaller components, and thinner plastics reinforced with carbon fiber, the new thin and light notebooks let you have your cake and eat it too. At about 6.4 pounds (including AC adapter) and 1.5 inches thick, they're nearly 2 pounds lighter and half an inch thinner than standard notebooks. Yet they still include one modular bay for swapping in a CD-ROM or floppy drive. You will pay a small premium for these portables, though: Low-end models start at about $2500. You may also pay a price in durability.

"There is definitely a concern when you try to go thinner and lighter. While the lighter plastics are formulated to be rigid, there's still more flex than you'll find in the thicker models," says Mike McGuire, a senior industry analyst at Dataquest, a market research firm. That means components have less protection from damage. And the protective buffer between the hard drive and the case is minimal.

To pick the best travel notebook from our pool of five contestants, we evaluated the details most important to travelers—weight, battery life, price, and workmanship—and to a lesser extent, performance. The winner: the Gateway Solo 5100 LS.

ROAD SHOW

THE GATEWAY'S 14.1-inch active-matrix screen makes it an especially attractive choice for those who want to give jaw-dropping presentations on the road. The notebook's light weight and long-lasting battery also help make it our top choice among travel-oriented models.

A big display usually means a heavier notebook, but Gateway kept the Solo's weight down to 6.4 pounds—the second-lightest in this class—and kept the price down to $3199. That's not bad for a notebook with a Pentium MMX-266 processor, a 56-kilobits-per-second x2 PC Card modem, and a battery that lasts 6 hours.

The Solo 5100 LS should hold up well on the road. Gateway added metal brackets to reinforce the plastic behind the screen. The curvy Solo also has sliding port covers that help prevent breakage. Although the Solo's keyboard is a tad mushy, you'll like the full-size <Backspace>, <Enter>, <Shift>, and <Ctrl> keys and the nicely tuned touchpad.

TRAVELING PAL

GOTTA CATCH A PLANE. Can't be late for the meeting. Business travelers already have enough to worry about. The last thing you need to fret over is whether your notebook will perform in a pinch—which is why the Panasonic CF-35 stands out.

Let's start with durability, an abstract concept until you drop your notebook and lose six months' worth of work. The slightly rounded CF-35 is more likely to survive a fall from an airplane tray table than any of the other thin and light portables we reviewed. The screen is encased in a magnesium alloy that seems nearly indestructible, and the hard drive is mounted in a shock-absorbing polymer gel—a first for a general-use notebook. Despite the extra protection, the CF-35, at 5.8 pounds, is the lightest of this bunch.

A great travel PC also needs a battery that will keep it humming from coast to coast. Here again, the Panasonic CF-35 took the gold with a 7.3-hour battery life.

But the Panasonic is lacking in a few areas. Its $2924 price is high for a notebook with a 12.1-inch active-matrix screen and a PMMX-200 CPU. More importantly, the standard CF-35 doesn't include a modem. (Hello? Travelers need to be wired.) And while we liked the firmly responsive keyboard, we found the touchpad buttons and cursor keys cramped.

SPEEDING TICKET

IBM'S THINKPAD 600 is the Concorde of travel portables. Powered by a Pentium II-266 CPU, the ThinkPad is among ▶

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*CyberMax named in Top-5 Technology listing**

1	NEC
2	Gateway 2000
3	Micron
4	Dell
5	CyberMax

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*PC Computing "The Direct 100" February '98

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Home Organizer CII-300

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- Ensoniq AudioPCI™ 32-bit Sound
- Altec Lansing ACS90 Speakers
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- Intel Pentium® II 400MHz Processor w/ MMX™
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"If you're looking for speed in everyday Windows applications, but don't want to spend the money for a 266MHz PII system, check out the CyberMax."
- Home PC Lab Winner/Home PC

For the second time, in a few short months, CyberMax received PC Computing's 5 Star Award. This time it was for our Cyrix 6x86MX, which offers exceptional value and performance when compared to the Pentium II. *"You won't find a better deal for Windows NT at these speeds."*
- PC Computing 5 Star Award September 1997

Every month for the last year CyberMax has appeared on PC World's Top-20 Budget Desktop list. As one analyst wrote, *"CyberMax delivers a lot of bang for the buck."*
- PC World Top 20 List

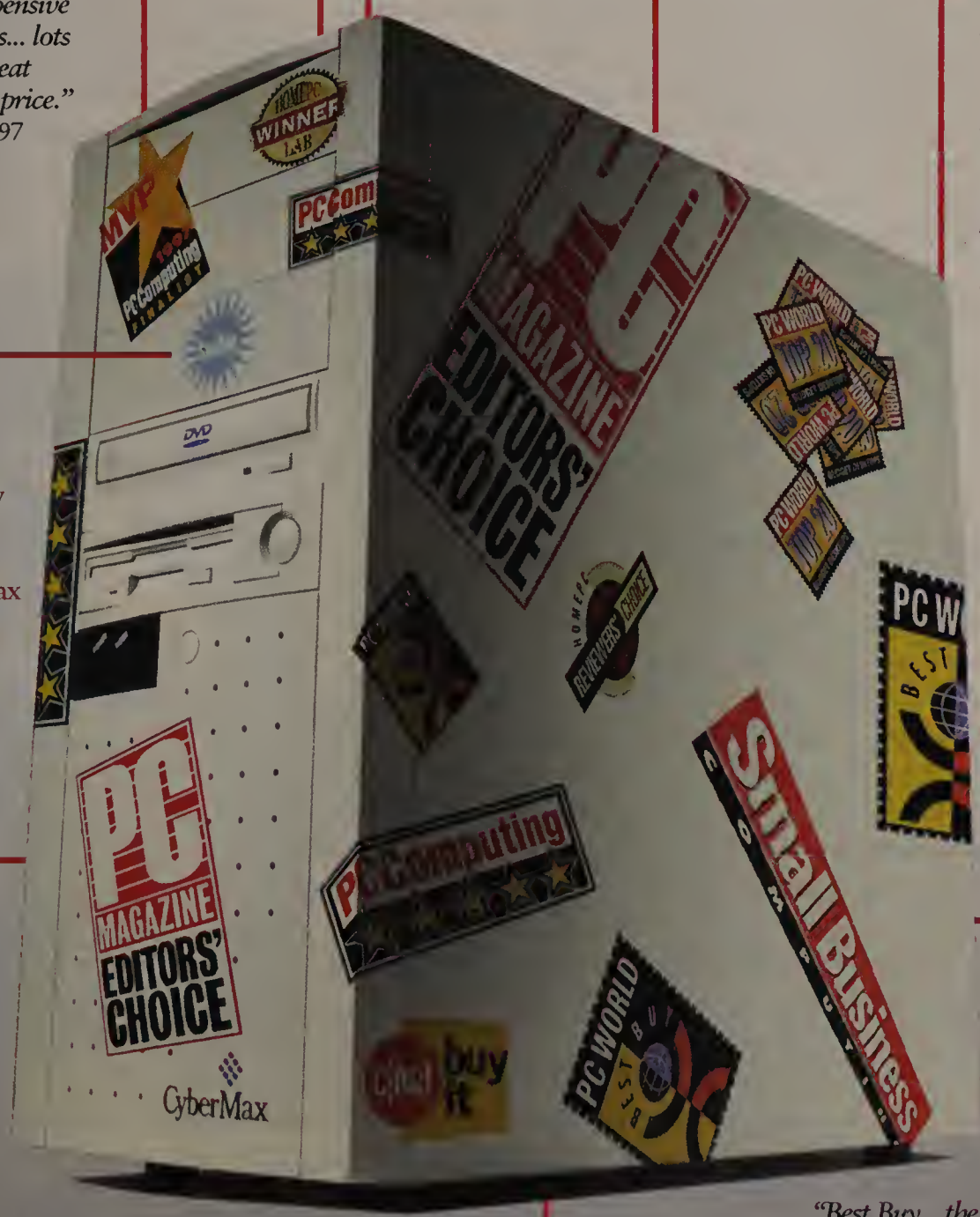
"PowerMax outpaced Dell's... Dimension XPS... the PowerMax makes an excellent bridge for that long migration to Windows® NT... tremendous bang for the buck."
- PC Computing MVP Finalist
Fall Comdex 1997

"The Max C6 233... earns our Editors' Choice because it offers the best balance of price, performance and features."
- PC Magazine: Editors' Choice September 1997

"The Max C6 233... stacks up well against those of the more expensive Pentium II 266 MHz systems... lots of room for expansion... a great balance of performance and price."
- Windows Stellar September 1997

"AMD's K6 chip strikes again, this time inside the multimedia wise CyberMax PowerMax, a Best Buy for the third month. Multimedia enthusiasts and game players will want to take a close look at this sturdy and expandable bargain-price tower."
- PC World Best Buy
February 1998

To win this system and learn more about the new AMD-K6-2 "The Smart Choice for 3D" visit
www.games.net/CyberMax



"... an incredible bargain... ideal for the cost-conscious yet demanding SOHO user... the PowerMax was nothing short of a great performer, it achieves such status without sacrificing a thing."
- PC Magazine Editors' Choice Award June 1997

"CyberMax's PowerMax delivers faster performance... for hundreds less."
- PC Computing 5 Star Award June 1997

"Best Buy... the CyberMax 6x86MX, an admirably well-rounded machine with a bargain basement price."
- Small Business Computing November 1997

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the fastest notebooks we've tested. At $4934, it's also among the priciest.

That speed takes its toll on battery life. (In our tests, PII notebooks drew about 30 percent more battery juice than their PMMX predecessors.) And the IBM's 13.3-inch active-matrix screen is on the large side, also drawing extra power. So the notebook's next-to-last finish in battery life—4.5 hours—isn't surprising. On the plus side, even with a 4GB hard drive and an internal 56-kbps modem, the ThinkPad 600 weighs only 6.4 pounds.

You'll also appreciate the ThinkPad's exceptional keyboard. The spacing and firmness of its keys are similar to what you find on full-size desktop keyboards. The ThinkPad 600 seems well constructed, too. The strong port covers on the back of the black case are reinforced with a rubberized strip—an IBM innovation.

ON A SHOESTRING

SO YOU'RE ON a limited budget, but you want a notebook to keep your business moving while you're on the road. Check out the $2499 Sony VAIO PCG-717C, the cheapest notebook in our travel lineup.

Cheap doesn't necessarily mean inferior. The Sony not only has a battery that lasted an impressive 6.4 hours, it's also the only travel notebook here that can take two batteries at the same time, allowing you to compute all the way from Los Angeles to London.

The Sony is also the most stylish of the five travel notebooks we tested. Its unique purplish-gray case is a refreshing change from the predictable blacks and grays most vendors use.

The Sony's configuration is basic: a PMMX-200 CPU that's a bit faster than the Panasonic CF-35's; an internal 33.6-kbps modem; a 2.1GB hard drive; and a 12.1-inch active-matrix screen. At 6.6 pounds, it's heavier than three of its four rivals, but less than a pound heavier than the lightest.

The keyboard action is crisp, but if you have large fingers you'll probably have trouble with the tightly packed keys. We can't give the PCG-717C perfect marks for durability, either. The port covers were the flimsiest of the bunch.

NOTHING TO WRITE HOME ABOUT

A STIMULATING travel companion, human or otherwise, can make all the difference on a long road trip. Unfortunately, NEC's Versa 5080X is the least exciting travel notebook we reviewed.

Frankly, we expected more from NEC, a leader in developing thin screens for notebooks. Not only is the 233-MHz Versa overpriced at $3499, but its 3.75-hour battery came in dead last in our tests.

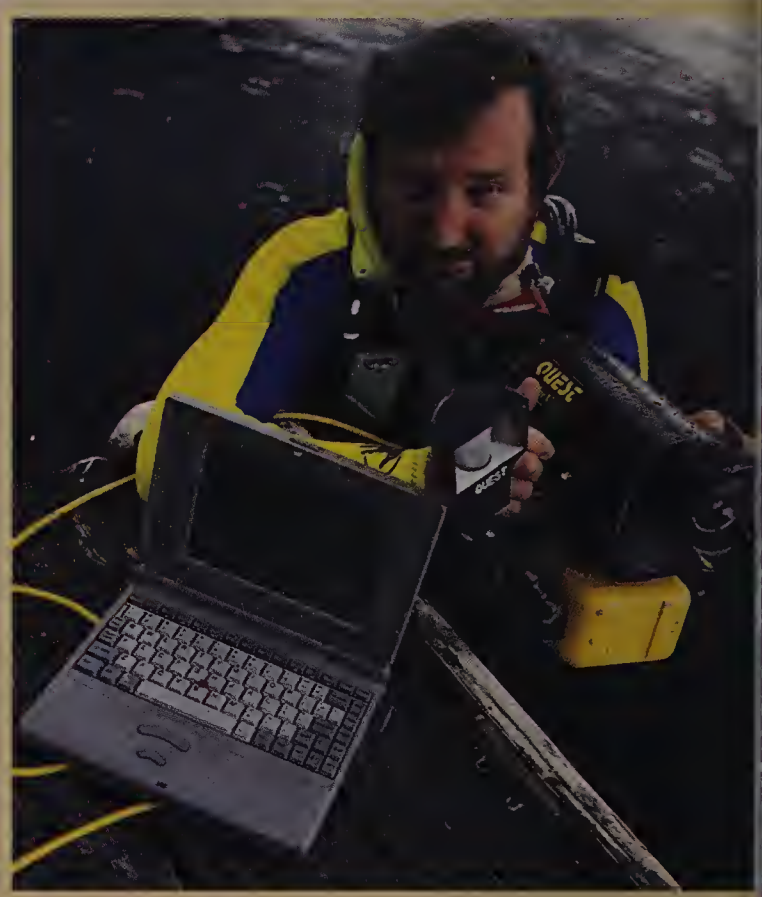
In our PC WorldBench testing, the Versa 5080X scored 104—slightly slower than average for a PMMX-233 notebook. In the Versa's favor are a bright 13.3-inch active-matrix screen and a solid key- ▶

Stories From the Front Lines

Underwater Professor Oceanographer **Joe Valencic** teaches class underwater and uses a notebook computer to do it. While shooting sea urchins with a video camera 20 feet below the surface off the Hawaiian coast, Valencic uses a microphone mounted in his diving mask to answer questions like, "Hey, what's that?" from more than a million students across North America. Joe and the kids communicate via a cell phone connected to his Toshiba Protégé notebook, which sits on the deck of a nearby boat. "Technology has unlocked the door to the global classroom, even underwater," Valencic says.

Fishing for Free Time Without his notebook, **Jack Robinson** might have given up fishing. Floating along placid Lake Ontario in his 17-foot boat, Robinson reels in his first salmon. He holds it up for a photo, unhooks it, throws it back in, and then—just as he pulls back to cast out again—he gets paged.

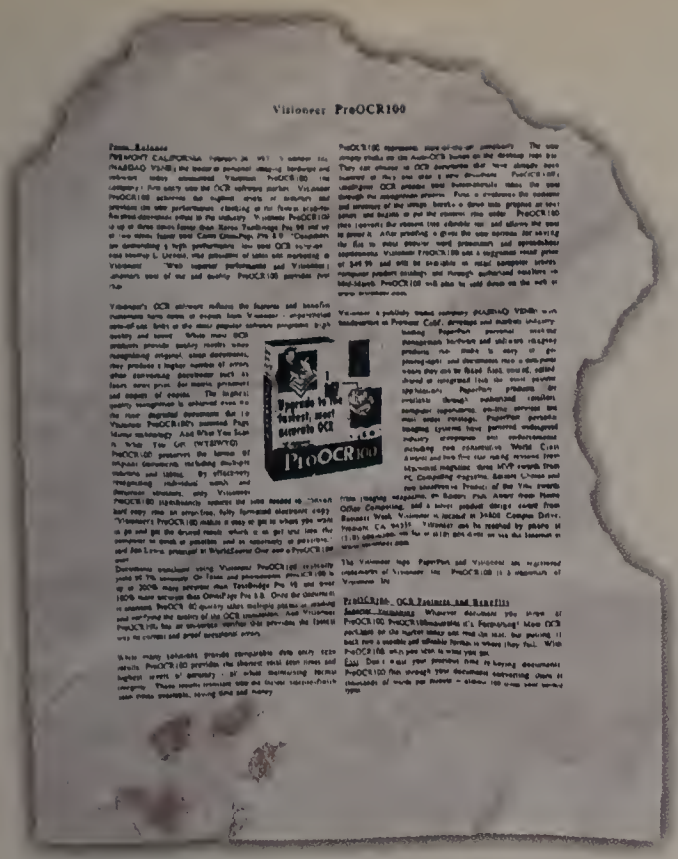
It's the office. Hooking his cell phone to his IBM ThinkPad notebook, Robinson, a LAN administrator in Toronto, returns the page. His job requires him to be available to deal with network problems and questions anytime, anywhere. Before he had a notebook, a page could easily become a 3-hour interruption—and put an end to Robinson's day of fishing. The new setup, he says, "has given me a little more balance in my personal life." With his notebook on board, he now hits the lake four times a week.

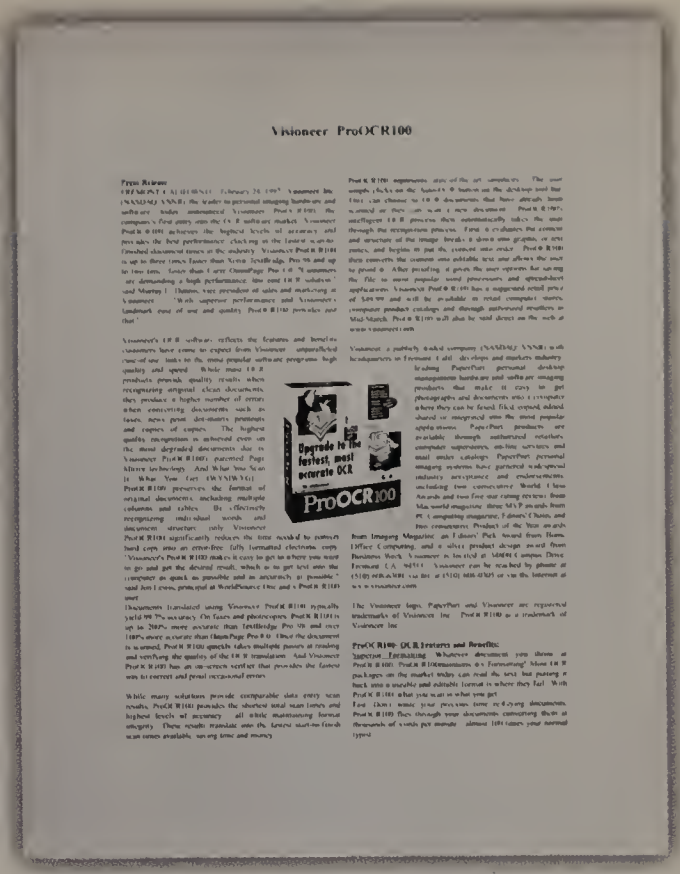


Oceanographer Joe Valencic's notebook lets him share his deep-sea adventures with millions of students.

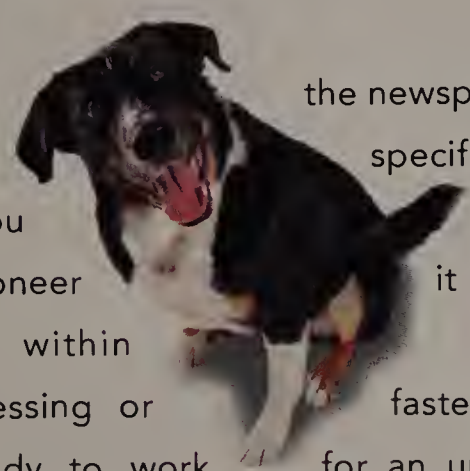
Extreme Skiing Sometimes a laptop can mean the difference between life and death. Hovering above the snowcapped mountains of Lake Tahoe in a helicopter, **Patrick Coggins** keeps his eyes glued to the blips on the screen of his Toshiba Satellite notebook. The blips represent the locations of "extreme skiers"—those who've become bored with mere chairlift schussing. The skiers, dropped by helicopter near the peak of a mountain, are now descending unmarked slopes. Using a Global Positioning System device with his notebook and transmitters attached to the skiers, Coggins makes sure no one gets lost. As CEO of Main Course Productions, a software firm in Norco, California, Coggins has also developed GPS applications for tracking fire jumpers as they tackle remote brush fires. "Notebook computers and GPS put us in the business of protecting life and property and making dreams come true," says Coggins. **—David Sparks**

PHOTOGRAPH: GARY MOSS





Visioneer ProOCR100 handles even the most degraded documents up to 200% faster.



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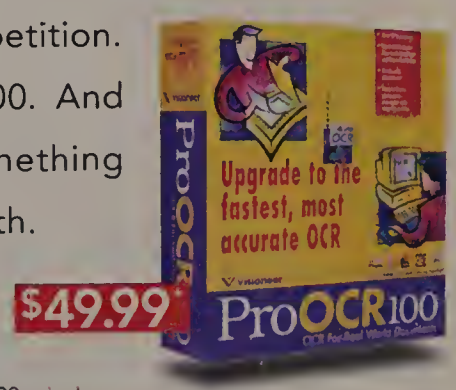

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Xerox TextBridge® Pro	$79.99	52	X	X	X	X	X
Caere OmniPage® Pro	$129.99	32	X	X	X	X	X

* As of March 1, 1998
** OCR times based on Visioneer's internal testing
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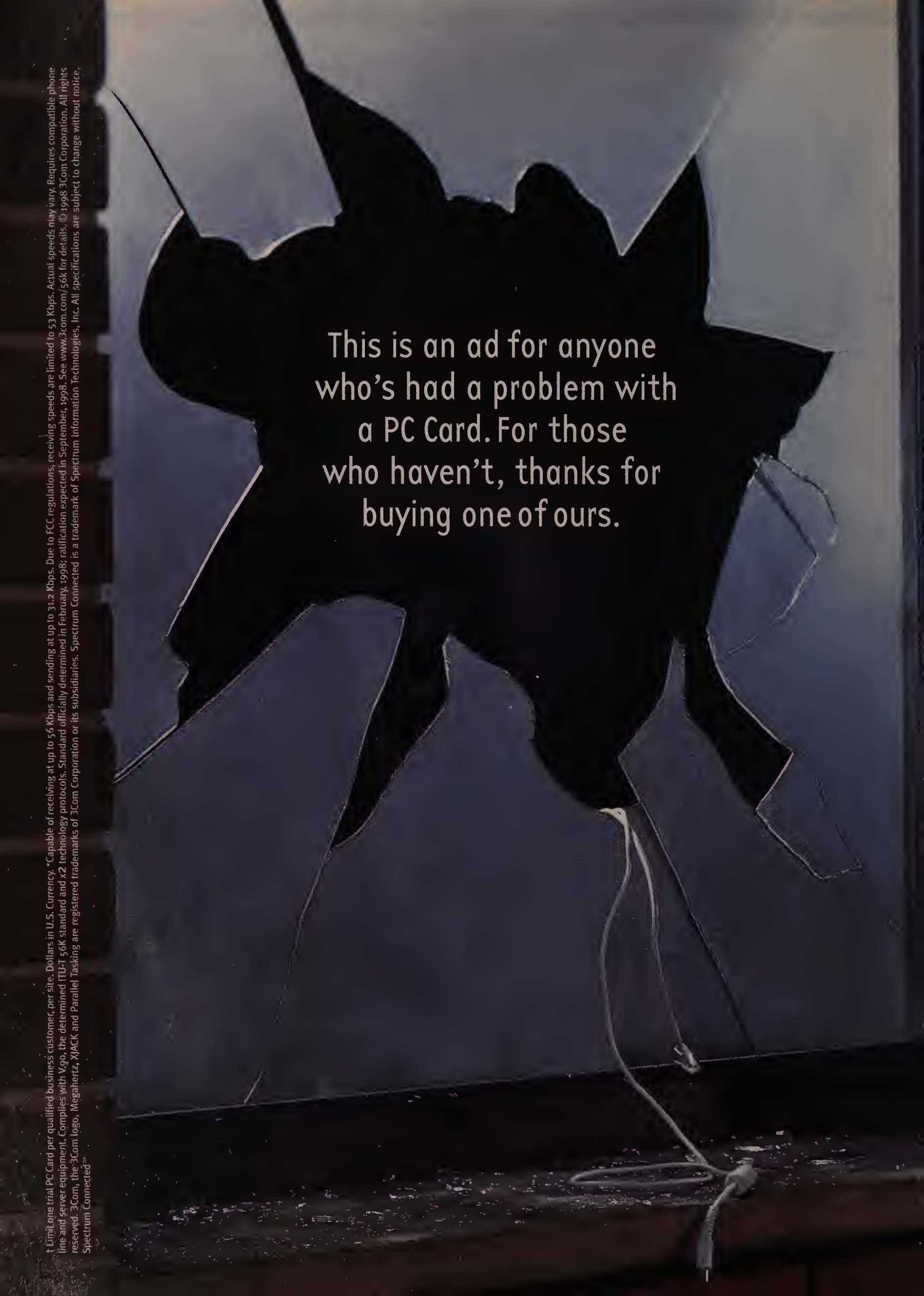

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board. We also liked the modular bay, which accepts a CD-ROM or floppy drive (both included), as well as an LS-120 storage drive (for $100 extra).

EVEN THINNER AND LIGHTER

VENDORS CONTINUE to shrink notebooks for travelers. Micron has a new 1.3-inch GoBook that arrived too late for this review, and NEC will have a similarly sized notebook weighing about 5 pounds.

Will that finally satisfy travelers like John Flory? Almost. "I'm looking for a machine that's 4 pounds or less," he says.

- **Gateway Solo 5100 LS;** $3199; Gateway; 800/846-2000; www.gateway.com

READER SERVICE NO. 646

- **IBM ThinkPad 600;** $4934; IBM; 800/426-2968; www.pc.ibm.com
- **NEC Versa 5080X;** $3499; NEC; 888/863-2669; www.necnow.com

READER SERVICE NO. 647

- **Panasonic CF-35;** $2924; Panasonic; 800/662-3537; www.panasonic.com

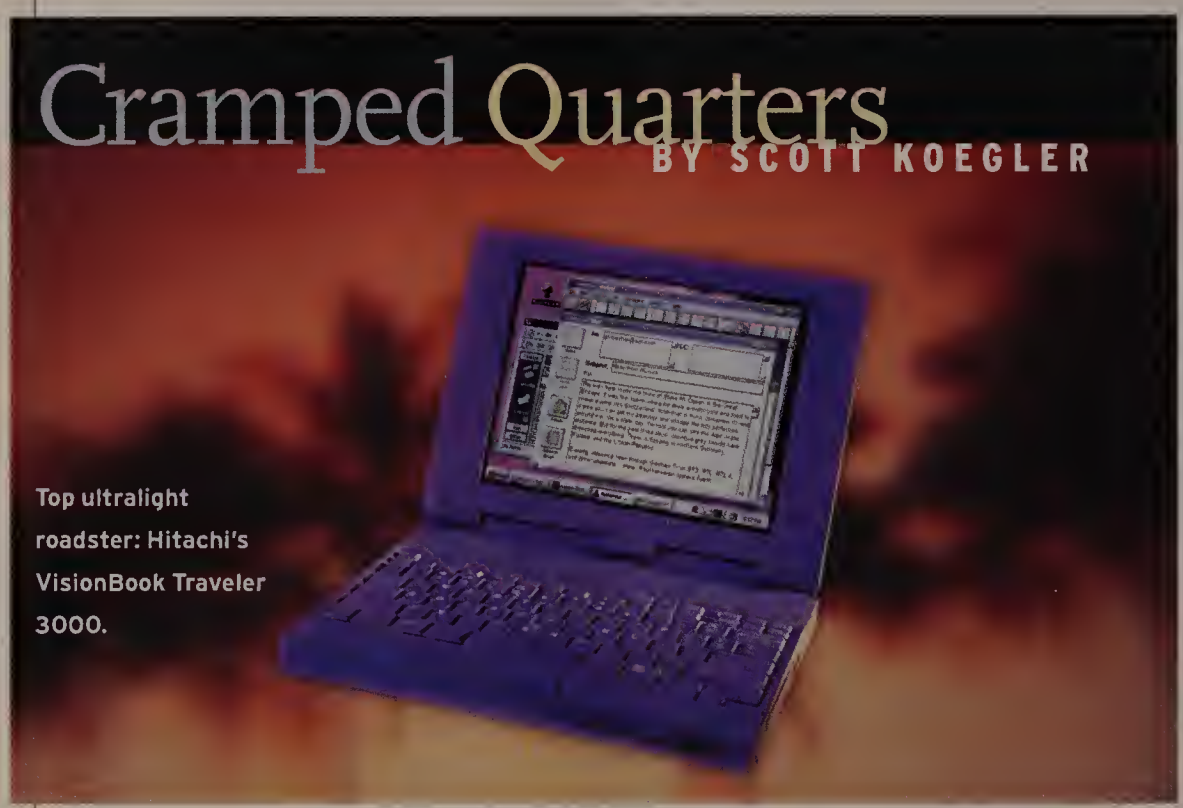
READER SERVICE NO. 648

- **Sony VAIO PCG-717C;** $2499; Sony; 800/476-6972; www.sony.com/pc

READER SERVICE NO. 649

Cramped Quarters

BY SCOTT KOEGLER



Top ultralight roadster: Hitachi's VisionBook Traveler 3000.

EVEN IF YOU LIKE working vacations, the last thing you want to drag along to the beach is a 9-pound laptop. So for a recent excursion to a Florida bed-and-breakfast, I took along the Hitachi VisionBook Traveler 3000, one of two new subnotebooks I road-tested for this article. (We didn't include the new Toshiba Libretto 100CT because of its even-smaller size. But see our review in this month's *New Products*, page 76.)

I wish I could say I spent hours under the palms comfortably tapping away on this ultraportable PC. Truth is, the VisionBook—along with the Mitsubishi Amity CN—suffers from a problem many older subnotebooks had: a keyboard that's frustratingly *almost* big enough.

NOT THERE YET

SUBNOTEBOOKS ARE a classic case of hope springing eternal. Somewhere between a handheld device and a standard notebook in size and weight, they straddle the line between leaving enough features out to be truly featherweight and keeping enough in to be useful.

The PMMX-133 Hitachi and P-133 Mitsubishi come with respective 1GB and 1.2GB hard drives. Both subnotebooks are about 9 inches wide, 7 inches deep, and 1.3 inches thick, and weigh only 4.2 pounds—including an external floppy drive and AC adapter.

Once I began using the tiny keyboards, and squinting at the wee screens, I was thankful I didn't have a lot of work to do.

KEYBOARD FOR KIDS

HITACHI BILLS ITS VisionBook keyboard as "nearly" full-size. That's like saying the Geo Metro is nearly a full-size car. Both subnotebooks' keyboards are just 9 inches wide, more than 2 inches shorter than standard—the perfect size for a 10-year-old. As I sat at a table, looking out at the ocean and feeling the weekend tick away, I found that my normally decent typing speed slowed to a crawl and my screen was still full of typos.

Tim Bajarin, a computer industry analyst with Creative Strategies, an industry research group, sees hope for subnotebooks—as souped-up personal digital assistants. "They are perfect for 'accessors'—salespeople and midlevel managers who make use of information but don't normally create it," Bajarin says.

But first the prices of subnotebooks will have to drop substantially. Currently, the $1999 Hitachi and $1995 Mitsubishi cost almost twice as much as standard notebooks with PMMX-133 CPUs.

A BETTER FUTURE

IF I HAD TO USE a subnotebook today, it would be the Hitachi VisionBook Traveler 3000. Its bright 8.5-inch active-matrix screen outshines the Mitsubishi Amity CN's 7.5-inch dual-scan display. The VisionBook also has a longer-lasting battery (3.4 hours compared to 2 hours). Armed with 8MB more RAM, the Hitachi also was the clear winner in our PC WorldBench test, running 41 percent faster than the Mitsubishi.

The immediate future of subnotebooks might depend on the Sony VAIO PCG 500 series, due out in July. After a quick tryout, one thing was clear: What a difference an extra inch makes. The Sony's 10-inch-wide keyboard is big enough to let me type at my normal speed. Sony says the subnotebook will have a PMMX-200 processor and sell for about $2000.

Bring on the mai-tais. I suddenly feel like doing a little subnotebook computing.

- **Hitachi VisionBook Traveler 3000;** $1999; Hitachi; 800/943-7607; www.hitachipc.com

READER SERVICE NO. 653

- **Mitsubishi Amity CN;** $1995; Mitsubishi; 888/445-5250; www.mitsubishi-mobile.com

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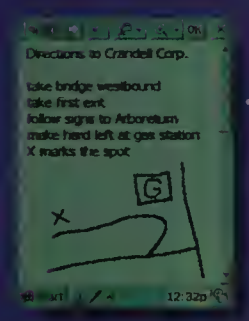

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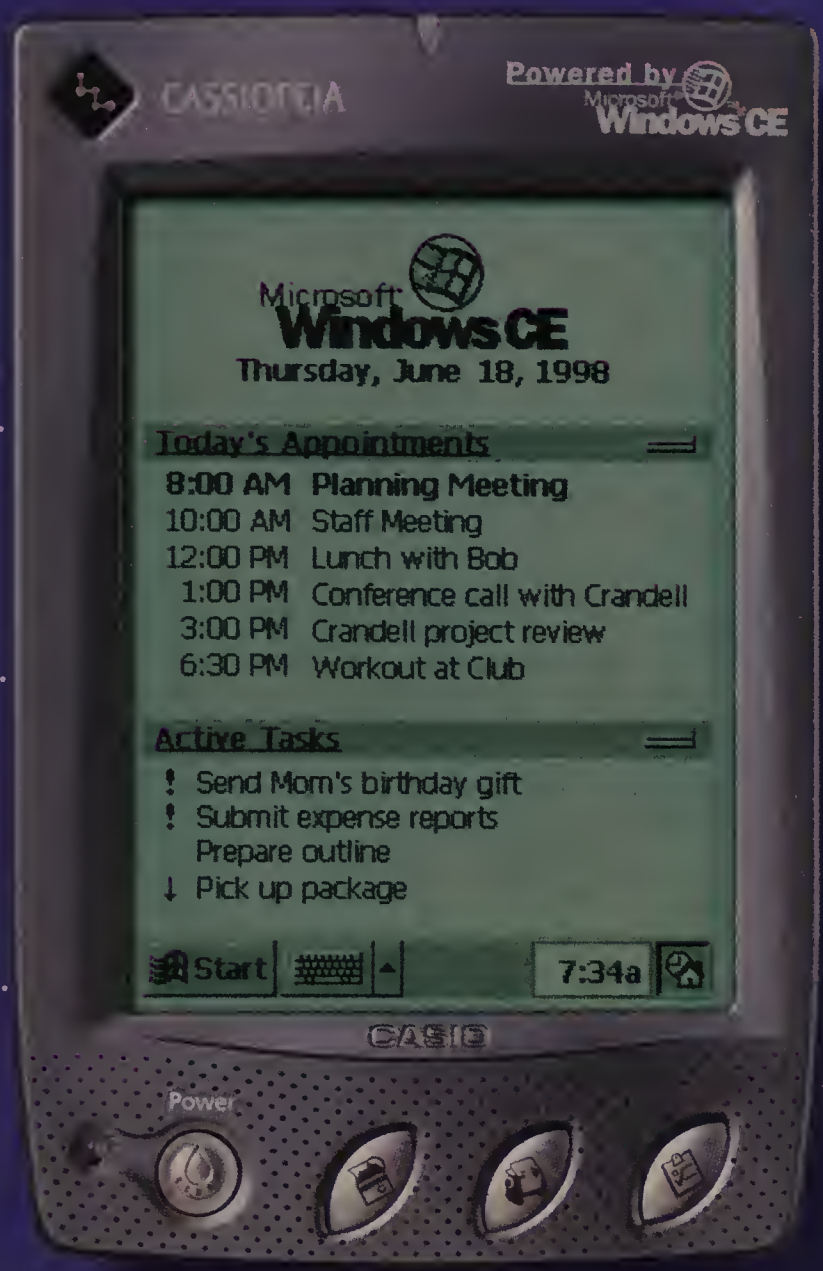

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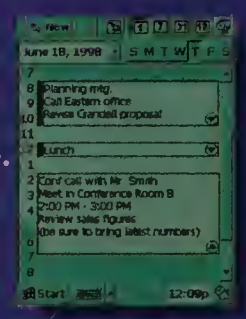

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BY TRACEY CAPEN

Our pick for computing in the rugged outdoors: Panasonic CF-25.

SCIENTISTS HAUL THEM INTO RAIN FORESTS to record data. Engineers bring them on site to view blueprints. Even stockbrokers tote their portables on sailing trips to keep tabs on the market.

Notebooks are going where no computer has gone before. But standard portables don't hold up well outdoors, particularly when nature gets nasty—which is why some manufacturers are adding ruggedized models to their notebook lines. While the original rough-and-tumble portables were massive and expensive (like the FieldWorks, which we didn't test), some of the newer ones resemble standard notebooks with a little extra protection.

I torture-tested two ruggedized notebooks—Panasonic's CF-25 and Amrel Systems' Rocky II—that shoot for a balance of durability and price. The $4399 CF-25 (with a Pentium MMX-166 CPU and a 10.4-inch active-matrix screen) has a molded magnesium case and a hard drive nestled in protective gel. The $5525 Rocky II (PMMX-166, 12.1-inch active-matrix screen) has rubber bumpers and a hard drive set in special mounts.

The only damage sustained by the Panasonic CF-25 after we drove an Isuzu Trooper over it was a muddy tire track.

Both notebooks are designed to withstand a soaking—all of the ports and bays have rubber covers. A metal tray under the CF-25's keyboard protects the innards from water and dirt, and the Rocky II's CD-ROM rests in a special box that fits into a sealed bay.

BETWEEN A ROCK AND A WET PLACE

WE WERE TOLD these notebooks could take quite a beating. "Use it in the rain," Amrel suggested. "Run over it with a HumVee," offered Panasonic. So we did.

Test 1—Water Torture: El Niño had been drenching the San Francisco Bay Area for weeks, but on the day of our tests the skies turned dry. Undaunted, I suited up in foul-weather gear and boarded a sailboat with the two notebooks. While I typed, another *PC World* editor drenched me and the notebook with a garden hose.

After a 15-minute soaking, not only did both notebooks work, but the CD-ROM drives and PC Card slots were dry inside. We were impressed, as were some local sailors who had gathered to watch.

Test 2—Roadkill: *PC World*'s HumVee was in the shop, so we used my Isuzu Trooper instead. We put the Panasonic CF-25 on the ground and drove one tire over it. The loud cracking sound seemed to confirm our suspicion that even a ruggedized notebook can take only so much. But when we retrieved the CF-25, we realized the sound had come from twigs beneath it. The computer was fine.

Test 3—Drop Zone: For our next test, I pretended I'd left the CF-25 on the spare tire bolted to the back of my Trooper and drove off, knocking the notebook 4.5 feet to the grassy ground. (Amrel wouldn't let us drop its notebook more than 2.5 feet.) After more than a dozen falls, the muddy Panasonic was still alive.

We didn't find the CF-25's Achilles heel until we tried a harsher drop test—a 2.5-foot drop onto concrete. After half a dozen drops, the CF-25 refused to start—the keyboard connector had popped out of the motherboard. After the same abuse, the Rocky II was bloodied but not beaten—its screen was cracked, but it still worked.

OUR CHAMP: THE PANASONIC

DESPITE BEING KO'D on concrete, the Panasonic CF-25 stood out as the better notebook overall. Both notebooks had comfortable screens, but the Panasonic's display was brighter than the Rocky II's. And on our PC WorldBench tests, the CF-25 outperformed the Rocky II by 14 percent. At 8.6 pounds (including AC adapter and CD-ROM drive), the Panasonic is also 2 pounds lighter.

I occasionally sail on the Pacific. If I could take either of these ruggedized notebooks along the next time I raise the sails, it would be the Panasonic CF-25.

- **Panasonic CF-25**; $4399; Panasonic; 800/662-3537; www.panasonic.com

READER SERVICE NUMBER 811

- **Amrel Rocky II**; $5525; Amrel Systems; 800/882-6735; www.amrel.com

READER SERVICE NUMBER 812

Vince Bielski is an associate editor and Tracey Capen an executive editor for PC World. *David English, Mike Hogan, Jon L. Jacobi, Carla King, Scott Koegler, and David Sparks are freelance writers.* ■

PHOTOGRAPH, LOWER LEFT, BY MARK COMPTON

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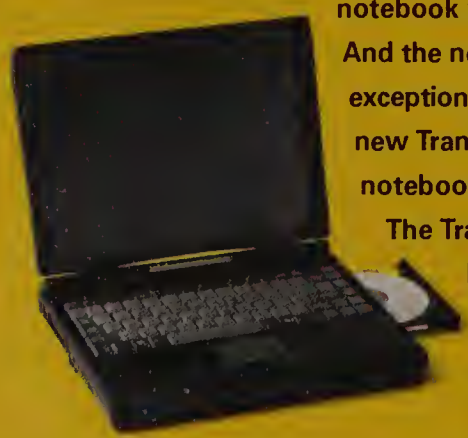

PC WORLD TransPort Trek Apr 98

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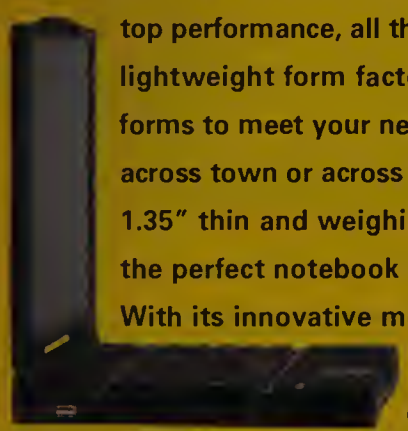

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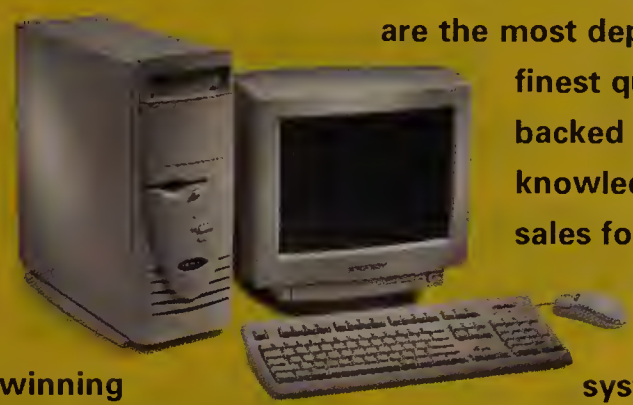

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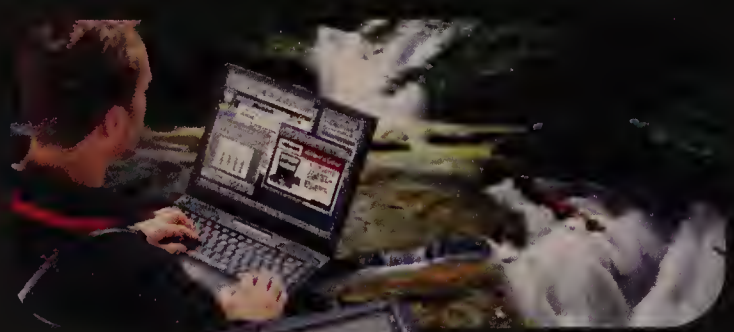

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CUT YOUR OWN CDs

Should you buy a recordable CD drive, a new rewritable, or wait for DVD-RAM? We took 16 CD-R and CD-RW drives and one next-generation DVD-RAM model for a spin.

BY JEFF SENGSTACK

PHOTOGRAPHS BY DAVID GAZ

THE RECORDABLE CD (CD-R) drive is a truly wonderful invention. Not only can it act as a quasi-backup device, it has two unique talents: It can make both music CDs and 650MB data CDs that anyone with a CD-ROM drive can read. Try *that* sometime with a Zip drive.

There's just one little problem with CD-R drives: You only have one shot at making a disc. Once recorded, a CD-R disc can't be altered. Enter rewritable CD-R drives (CD-RW), which let you erase and reuse special CD-RW discs hundreds of times.

Formerly very pricey, CD-RW drives now sell for as little as $399, almost as cheap as their CD-R ▶

siblings. Which raises the question: Are CD-R drives still worth buying?

CD-R is still in the game, but probably not for much longer. After testing seven CD-R drives and nine CD-RW drives from Hewlett-Packard, Ricoh, Sony, and other leading manufacturers, we concluded that a CD-R drive is still a good buy if you plan on churning out CDs every day. But the case for CD-RW is strong: If you don't mind the slower speed, a CD-RW drive can do everything a CD-R can, plus give you the choice of using rewritable discs.

BEST BUYS

THE BEST ALL-AROUND CD-R DRIVE is Teac's 4X12. For $549, you get a small, quiet drive with top-notch speed, and, for a SCSI drive, painless installation. Among CD-RW drives, the Hewlett-Packard CD-Writer Plus 7200i is the hands-down winner. At $425, it's relatively cheap, and it has the terrific combination of a large software bundle, fast performance, and easy setup.

IS CD-RW FOR YOU?

LIKE CD-R DRIVES, CD-RW models are ideal for creating customized music or multimedia CDs, and for archiving or distributing big files such as databases or digital images. They can make the same write-once CDs that CD-R drives do, so you can pass out your work to anyone you please. Both types of drives use easy-to-learn recording software that is much improved over what was available just a couple of years ago. But best of all, the option CD-RW gives you of recording over old data makes CDs almost as much a breeze to reuse as floppies. Imagine updating your CD-based multimedia presentation with the latest sales figures, for

RANKING WRITABLE CD DRIVES — FEATURES COMPARISON

CD-R DRIVES	Street price (3/19/98)	Speeds [1]	★ Overall rating	Price	Performance	Features	Installation	Support quality/ policies
Teac 4X12 213/727-0303 www.teac.com	$549	4X/12X	best	average	very good	good	good	good/ good
Plextor PlexWriter PX-R412Ce/PCI 800/886-3935 www.plextor.com	$704	4X/12X	very good	very expensive	good	very good	good	excellent/ very good
Verbatim CDR 4x12 800/421-4188 www.verbatimcorp.com	$550	4X/12X	good	average	very good	very good	good	good/ good
Mitsumi CR-2801TE 800/648-7864 www.mitsumi.com	$349	2X/8X	good	inexpensive	poor	very good	very good	good/ very good
Plextor PlexWriter PX-R412Ce/ISA 800/886-3935 www.plextor.com	$669	4X/12X	good	very expensive	good	very good	satisfactory	excellent/ very good
Sony Spressa CDU928E/C 800/352-7669 www.sony.com/storagebysony	$300	2X/8X	fair	inexpensive	poor	satisfactory	good	very good/ outstanding
MicroNet Master CD Plus 4X12PC 800/800-3475 www.micronet.com	$599	4X/12X	fair	expensive	good	good	satisfactory	good/ very good
CD-RW DRIVES								
Hewlett-Packard CD-Writer Plus 7200i 800/752-0900 www.hp.com/go/cdr	$425	2X/2X/6X	best	average	satisfactory	very good	very good	very good/ good
Hewlett-Packard CD-Writer Plus 7200e 800/752-0900 www.hp.com/go/cdr	$525	2X/2X/4X	good	expensive	satisfactory	very good	outstanding	very good/ good
Hi-Val 2x6x2 CD-RW 800/448-2596 www.hival.com	$400	2X/2X/6X	good	average	good	limited	good	poor/ good
Smart and Friendly CD-RW 226 Plus 800/959-7001 www.smartandfriendly.com	$399	2X/2X/6X	good	average	poor	satisfactory	poor	poor/ very good
Smart and Friendly CD-RW 426 Deluxe 800/959-7001 www.smartandfriendly.com	$699	4X/2X/6X	good	very expensive	very good	good	poor	poor/ very good
Verbatim CD-RW 226 800/421-4188 www.verbatimcorp.com	$599	2X/2X/6X	good	expensive	satisfactory	good	good	satisfactory/ good
Yamaha CRW4001ti-PC 800/823-6414 www.yamaha.com	$499	4X/2X/6X	good	average	good	satisfactory	good	poor/ satisfactory
Ricoh Media Master ATAPI 702/352-1600 www.ricohcpg.com	$499	2X/2X/6X	fair	average	poor	good	good	poor/ satisfactory
Ricoh Media Master MP-6200S 702/352-1600 www.ricohcpg.com	$599	2X/2X/6X	fair	expensive	satisfactory	good	poor	poor/ satisfactory

Best Buy ● Yes ○ No

Note: All drives come with a one-year warranty.

[1] CD-R drives: record/read; CD-RW drives: CD-R record/CD-RW record/read. 1X = 150KB per second.

instance, or using the same CD to make fresh backups of important files.

Nevertheless, you might want to hold off on buying a CD-RW drive. Why? One reason is limited compatibility. Most CD-ROM drives still won't read rewritable (CD-RW) discs. Only the newest CD-ROM drives support MultiRead, the standard that makes reading CD-RW discs possible. The upshot? If you mostly cut editable discs, you may be the only one to see the fruits of your labor.

Another tradeoff is speed. Although faster CD-RW drives are expected out in the fall, most current models are limited to a recording speed of 2X (unlike CD-R drives, most of which are 4X). As a result, in our tests it usually took a CD-RW drive about twice as long—up to 27 minutes—as a CD-R drive to fill a CD-R disc. CD-RW drives also *play* discs at half the speed—4X to 6X, versus 8X to 12X for CD-R drives. This makes them an even poorer replacement for your current CD-ROM drive than a CD-R model. (Our advice: Keep your CD-ROM drive for playback, no matter which type of recordable drive you buy. You'll need an extra drive anyway if you want to make copies of music CDs.)

Finally, keep in mind that CD-RW discs are still pricey, although this should change soon. At $15 apiece, CD-RW discs cost about eight times more than CD-R discs—so you'll have to recycle the same disc several times before you recoup your investment.

Start the Music

If you can't copy audio CDs directly from your CD-ROM drive, see if the drive supports digital audio extraction. If not, you'll need to upgrade it.

BEST OF THE BUNCH

PICKING ONE TYPE of drive over the other is a tough decision right now, so we awarded Best Buys in both camps. Teac's 4X12 is our favorite CD-R drive. This $549 SCSI model is about average in price, and is both one of the fastest we tested and one of the easiest of the SCSI units to set up. Of the CD-RW drives, HP's $425 internal CD-Writer Plus 7200i is our pick. It's a snap to install and use, is the speediest CD-RW drive we tested, and comes with a raft of software besides the usual CD creation utilities.

If you're looking for a CD-RW drive to share with others, check out the external version of this drive, HP's CD-Writer Plus 7200e. It was the easiest to install of all the drives we tested, and the simplest ▶

		FEATURES			SUPPORT			
Documentation	Comments	Drive type	PC/drive interface adapter	Drive size (inches)	Toll-free support	Weekday support (hours)	Weekend support	Reader service number
good	Top-notch mix of speed and easy setup.	external	Adaptec 2904 SCSI-PCI	9.5 X 7.5 X 2.5	○	9	none	724
satisfactory	Best all-around drive except for sky-high price and overly technical documentation.	external	Adaptec 2930 SCSI-PCI	12 X 7 X 2.3	●	11	none	725
poor	Very good performer, but documentation too sparse.	internal	Advansys SCSI-PCI	fits 5.25" bay	●	13	none	726
very good	Priced right and a snap to install, but exceptionally slow at copying files using packet writing.	internal	EIDE	fits 5.25" bay	●	11	none	727
satisfactory	Fast, well supported, but almost as pricey as its SCSI-PCI sibling and harder to install.	external	Advansys SCSI-ISA	12 X 7 X 2.3	●	11	none	728
poor	Lowest cost, easy to install, well supported; slowest CD-R drive reviewed, can't do packet writing.	internal	EIDE	fits 5.25" bay	●	24	Sat., Sun.	729
poor	Performs well, but is pricey, noisy, bulky, and a little difficult to set up.	external	Adaptec 2904 SCSI-PCI	11 X 9.8 X 2.3	○	24	Sat., Sun.	730
excellent	Appealing in every respect.	internal	EIDE	fits 5.25" bay	○	12	none	731
excellent	A cinch to set up, but takes forever to copy files to it.	external	parallel	11 X 7 X 2.6	○	12	none	732
poor	Bargain price, but lousy support and insufficient documentation.	internal	EIDE	fits 5.25" bay	●	10	none	733
poor	Lowest cost of the CD-RW lot; hobbled by slow speed, tough installation, hard-to-reach help.	internal	SAF SCSI-ISA	fits 5.25" bay	●	12.5	Sat.	734
poor	Best performance; priciest CD-RW drive reviewed, hard to set up, hard to reach support reps.	external	SAF SCSI-ISA	10.5 X 9.8 X 2.5	●	12.5	Sat.	735
poor	So-so drive with high price and subpar support and documentation.	external	Advansys SCSI-PCI	11 X 7 X 2.3	●	13	none	736
poor	Good speed and price, easy setup can't make up for inability to overwrite CD-RW discs.	internal	EIDE	fits 5.25" bay	○	8.5	none	737
poor	Easier to install than its SCSI-ISA sibling; slowest of the bunch, lousy support and documentation.	internal	EIDE	fits 5.25" bay	○	10	none	738
poor	Pricey, installation can be a headache, terrible support and documentation.	internal	PE Logic SCSI-ISA	fits 5.25" bay	○	10	none	739
							All products:	908

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to move from one PC to another. However, making CDs with this drive slows your other work to a crawl. It hogged so much of the processor on our test PC, even our mouse pointer could only twitch.

Plextor's CD-R drive, the PlexWriter PX-R412Ce/PCI, is another standout. It has an extra button for changing tracks and fast-forwarding through music CD selections. It also includes an audio cable you can connect to your sound card so you can listen to music on the CD-R drive while using your CD-ROM for other tasks. But you pay extra for these luxuries—at $704, the PlexWriter is the priciest of the lot.

We had the worst experiences with Ricoh's Media Master MP-6200S, a CD-RW drive, and MicroNet's Master CD Plus 4X12PC, a CD-R model. Both were expensive and had a number of other shortcomings. The MicroNet is fast, but installing the bulky unit was a chore, and its cooling fan is noisy. The Ricoh model was hard to install, its lousy support and manuals were no help, and the drive's performance was only so-so.

What about DVD-RAM? If you've heard the buzz about these next-generation recordable drives, you're probably wondering if you should skip CD-RW altogether. Like CD-RW on steroids, DVD-RAM drives can record and rewrite up to 5.2GB on one double-sided disc—more than eight times the capacity of a CD.

Should you hold out for DVD-RAM? If our first look at Hitachi's GF-1050 DVD-RAM drive is any indication, rewritable DVD drives will be killer recording devices. You'll probably want to wait for prices to come down, however, and for standards issues to be hammered out. For details, see "Sneak Preview: Taking DVD-RAM for a Spin."

MORE DRIVE CHOICES

UNTIL RECENTLY, about the only type of CD-R drive you could buy was a SCSI model you had to install inside your PC—about the hardest type of peripheral to set up. These days, you have a much wider choice: internal or external, and SCSI, EIDE, or parallel port. (Most PCs made in the last few years support EIDE— ▶

TEST REPORT

Need to Burn a CD Quick? Get a 4X Drive

A CD-R or CD-RW drive with a 4X record speed takes half the time of a 2X drive.

			Read speed		Record speed to CD-R Discs			Record speed to CD-RW discs			
	DRIVES	Interface	Vendor spec.[1]	Tested rate	Vendor spec.[1]	Creator (min:sec)	Packet writing (min:sec)[2]	Vendor spec.[1]	Creator (min:sec)	Packet writing (min:sec)	Packet-writing overwrite (min:sec)
CD-R Drives	Teac 4X12*	SCSI-PCI	12X	12X	4X	13:36	18:11	–	–	–	–
	Plextor PlexWriter PX-R412Ce/PCI	SCSI-PCI	12X	10X	4X	13:46	12:33	–	–	–	–
	Verbatim CDR 4x12	SCSI-PCI	12X	12.1X	4X	13:36	17:43	–	–	–	–
	Mitsumi CR-2801TE	EIDE	8X	7.5X	2X	27:11	62:23	–	–	–	–
	Plextor PlexWriter PX-R412Ce/ISA	SCSI-ISA	12X	10X	4X	13:46	12:59	–	–	–	–
	Sony Spressa CDU928E/C	EIDE	8X	8X	2X	26:43	–[3]	–	–	–	–
	MicroNet Master CD Plus 4X12PC	SCSI-PCI	12X	10X	4X	13:47	18:03	–	–	–	–
CD-RW Drives	Hewlett-Packard CD-Writer Plus 7200i*	EIDE	6X	5.2X	2X	27:16	–	2X	27:28	30:48	34:56
	Hewlett-Packard CD-Writer Plus 7200e	parallel	4X	4.3X	2X	27:14	–	2X	27:49	30:33	35:47
	Hi-Val 2x6x2 CD-RW	EIDE	6X	6.5X	2X	27:18	–	2X	27:46	32:39	34:29
	Smart and Friendly CD-RW 226 Plus	SCSI-ISA	6X	4.9X	2X	27:14	–	2X	27:11	44:51	–[4]
	Smart and Friendly CD-RW 426 Deluxe	SCSI-ISA	6X	5.9X	4X	13:38	–	2X	26:55	30:21	30:36
	Verbatim CD-RW 226	SCSI-PCI	6X	5.1X	2X	27:12	–	2X	27:11	47:16	49:48
	Yamaha CRW4001ti-PC	EIDE	6X	5.9X	4X	13:34	–	2X	26:49	36:24	–[4]
	Ricoh Media Master ATAPI	EIDE	6X	4X	2X	27:08	–	2X	27:13	51:32	51:16
	Ricoh Media Master MP-6200S	SCSI-ISA	6X	5.2X	2X	27:02	–	2X	27:08	49:40	47:30

*Best Buy

TEST PC WORLD CENTER

HOW WE TEST Our test bed consisted of a Pentium MMX-200 PC with a 3GB IDE hard drive and an 8X IDE CD-ROM drive. On each drive, we timed how long it took to copy 430MB of files to CD-RW discs (for CD-RW drives only) and CD-R discs using both Adaptec's Easy CD Creator and the bundled packet-writing tool (either Adaptec's DirectCD or CeQuadrat's Packet CD). Read tests were performed using the CDTach 1.50 CD-ROM benchmark. [1]1x = 150 kilobytes per second. [2]Tests not performed on CD-RW drives. [3]The Spressa doesn't offer packet-writing capabilities. [4]Could not perfom overwrite tests.

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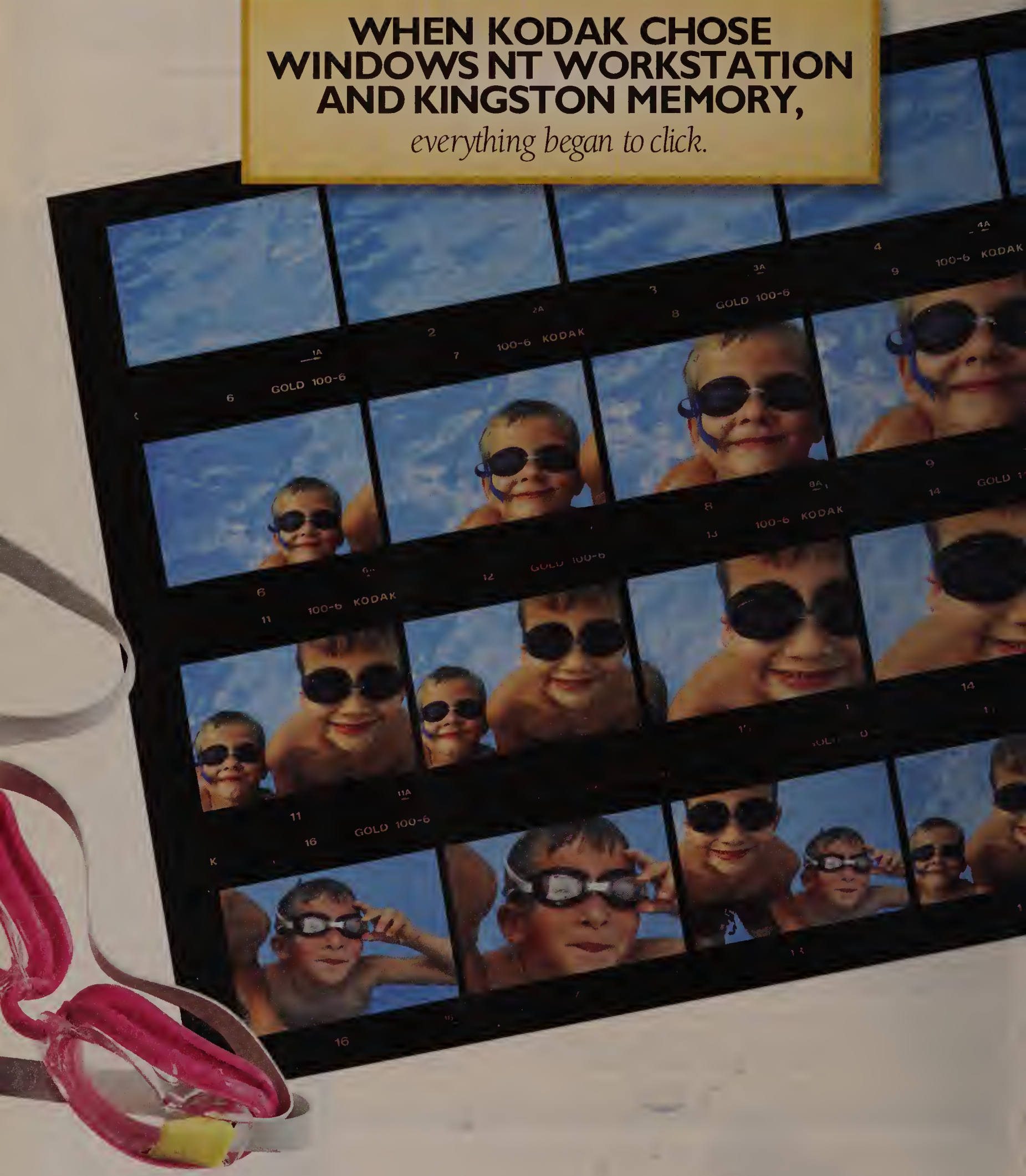

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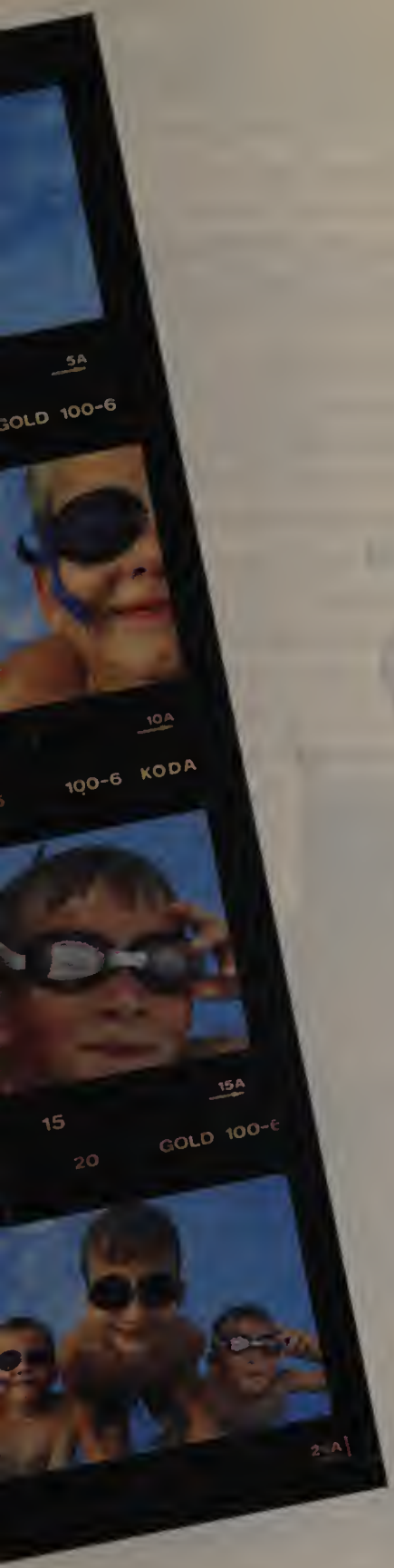

❶ NATURALLY, KODAK LOOKED AT ALL THE OPTIONS. But how many operating systems would you trust with 45,000 users? Stability and reliability were Kodak's first priorities. But because their networks are scattered all around the globe, security was a big issue too. In the end, the decision was easy—Microsoft® Windows NT™ Workstation 4.0.

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check with your vendor if your machine is older.)

An external drive is obviously the best choice if you intend to share your CD recorder, and a parallel port drive like the HP CD-Writer Plus 7200e is a cinch to install.

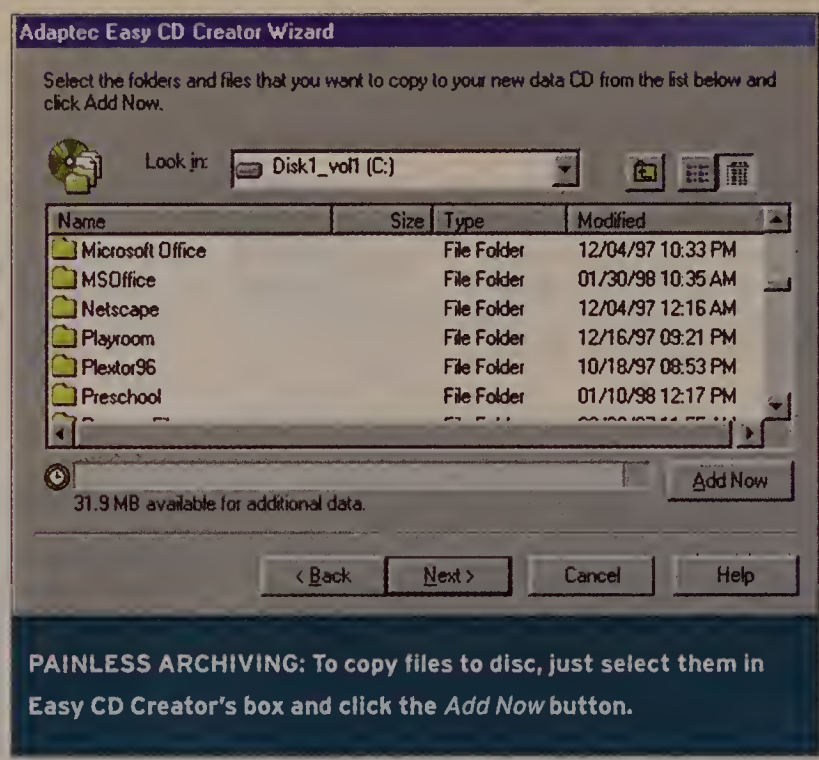
Of the remaining drives we tested, the EIDE models were next easiest, followed by SCSI drives that used PCI adapter cards. SCSI drives that use ISA cards, an older type of adapter, were the only ones that gave us any serious grief.

For most of the EIDE drives, setup took about 15 minutes. We popped open the PC case, slid the drive into a free bay, and attached it to a free IDE connector. When we fired up the PC, we were prompted only to install the driver; Windows 95 then recognized the drive as a CD-ROM drive and automatically assigned it a drive letter.

The SCSI-PCI drives were nearly as easy to set up. In each case, we pushed the SCSI card into an open PCI slot, attached the CD drive, and turned on the PC; Windows 95 handled the rest.

The drives that used ISA SCSI adapter cards were the hardest to install because we had to spend time hunting down settings. To set up the Ricoh and the Smart and Friendly drives, for example, we had to determine available IRQs and I/O port addresses and set the jumpers for them—something on which a novice could easily spend all day, even with tech support on the phone.

We recommend using SCSI-ISA setups only if your computer lacks free PCI slots. (In fact, some of Ricoh's reps admitted that they sometimes tell callers to ditch their ISA SCSI cards and get PCI-based ones instead.) ▶



PAINLESS ARCHIVING: To copy files to disc, just select them in Easy CD Creator's box and click the *Add Now* button.

SNEAK PREVIEW Taking DVD-RAM for a Spin

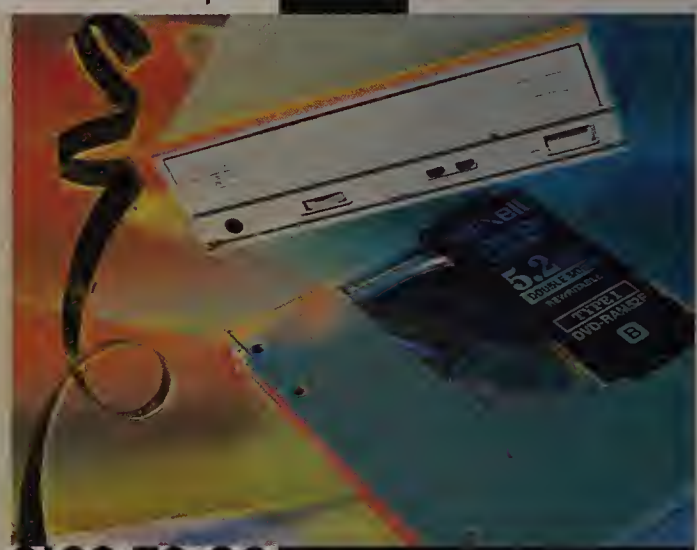
REWRITABLE DISC DRIVES seem to be taking a page from the music industry. Similar to the way our record collections yielded to cassettes, which in turn gave way to CDs, CD-R is currently being swallowed by CD-RW, which itself may soon be thrown over by rewritable DVD drives.

No doubt about it, rewritable DVD will eventually replace everything. But if you're on the brink of buying a new CD-RW drive, don't panic. Based on what we're hearing, it will be a while before a rewritable DVD drive is a better buy than a CD-RW model.

EASY RECORDING

WE RAN INFORMAL tests on a prerelease Hitachi GF-1050 drive, a unit based on the DVD-RAM rewritable format. Our first spin was promising. The GF-1050, which should be on the market by the time you read this, was as easy to install and use as most of the CD-RW drives we tested: To record to a DVD-RAM disc, you just copy files using Windows 95's Explorer. It also delivered on most compatibility claims, reading CD-ROMs, audio CDs, CD-R, and even CD-RW discs, something few CD-ROM drives can do. It also read DVD-ROM discs.

Hitachi does have a few kinks to work out. The company promises superfast 9X recording speeds in production DVD-RAM drives, but the unit we tested recorded at only 0.5X, which is much slower than even the pokiest CD-RW drive in our roundup. We were also disappointed to get only 2.32GB on each 2.6GB side of the double-sided discs that came with the unit—about 500MB short of the promised 5.2GB. Still, total capacity came to more than seven times that of a 650MB CD-ROM disc—quite enough to back up most hard drives.



GIGS TO GO Hitachi's DVD-RAM drive stores 5.2GB on a CD-ROM-sized disc.

HOLD OFF FOR NOW

EVEN WITHOUT the snags, we don't recommend DVD-RAM yet. The drives will sell for $750 and up, about twice the cost of some CD-RWs. The 5.2GB discs are also very expensive—$40 a pop. Current DVD-RAM drives also have a couple of compatibility drawbacks: They can't write to CD-R and CD-RW discs, robbing you of a cheap, easy-to-distribute massive-storage option. And no DVD player or DVD-ROM drive can read DVD-RAM discs. The biggest concern, however, is the brewing standards battle, which could hamper your ability to widely share rewritable DVD discs. The main challenger is a format called DVD+RW, which promises 6GB—instead of 5.2GB—per double-sided disc. Backed by a consortium that includes Sony, Philips, and Hewlett-Packard, DVD+RW drives are due out by year-end. If you want high-capacity optical storage, a CD-R or CD-RW drive is still your best bet for the next 18 to 24 months. —Lincoln Spector

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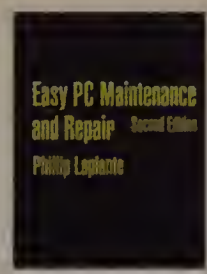

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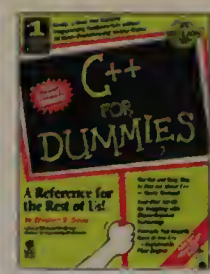

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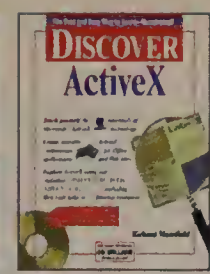

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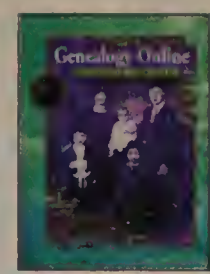

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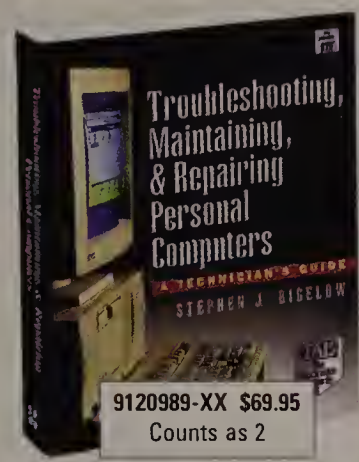

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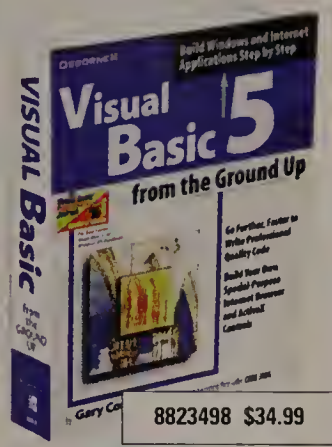

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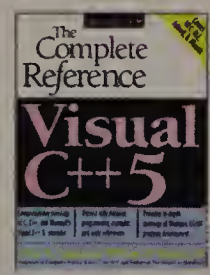

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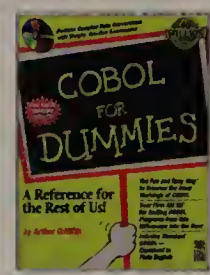

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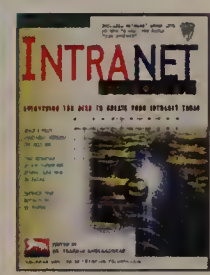

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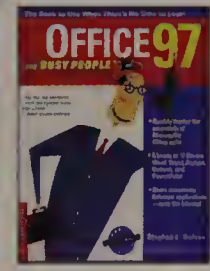

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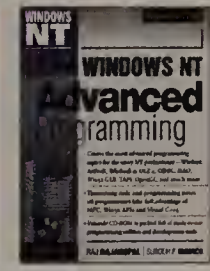

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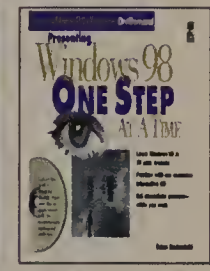

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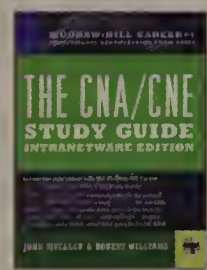

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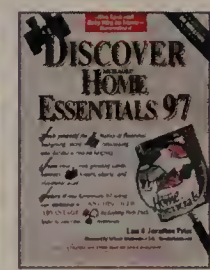

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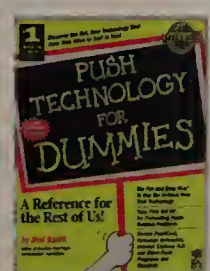

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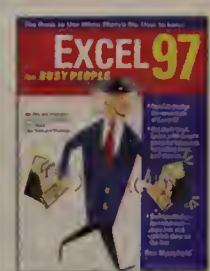
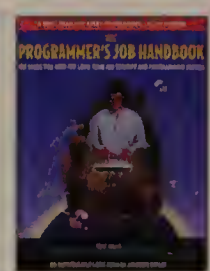


8822793 $24.99



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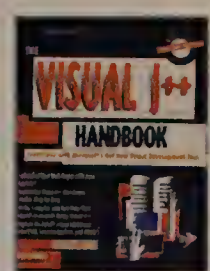

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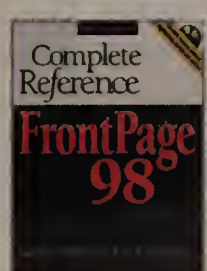
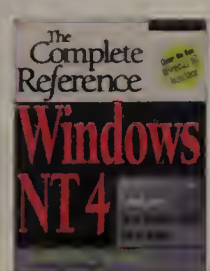


8823943 $39.99



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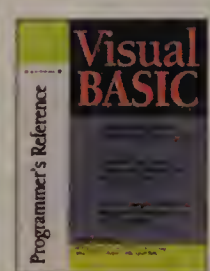

8824583 $16.99

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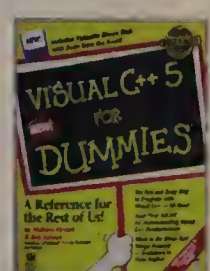

5878283 $24.99

SOMEBODY HELP!

ALAS, FEW OF THESE recordable-drive vendors offered advice even as useful as that. Most of the printed and telephone help we encountered was disappointing, to say the least.

Plextor had the best telephone support: Its reps kept us on hold for only 5 minutes and gave us expert, friendly service. HP kept us waiting on the line only a little longer, and had the best documentation, hands down. The HP CD-Writer Plus 7200i, our Best Buy CD-RW drive, comes with a clearly written, well-illustrated manual that includes a nicely detailed troubleshooting section. HP even packs in a how-to video on recording a CD.

We give Mitsumi the next-best overall marks for support. We found its hardware manual well organized, with plenty of hand-holding for novices, if not quite enough illustrations. As with Teac and Verbatim, Mitsumi usually made us leave messages, but we got good advice when reps finally called back.

Sony gets the Midnight Oil Award for answering our middle-of-the-night calls. Boos and hisses go to Hi-Val, Smart and Friendly, and Yamaha, which left us on hold or wandering among endless voice-mail menus. Ditto for the documentation from Verbatim and Ricoh (nearly useless), Hi-Val (nonexistent), and MicroNet, Smart and Friendly, and Sony (much too generic).

CREATOR OR PACKET WRITING?

FORTUNATELY, you won't have to depend on vendor support too much to start popping out your own CDs with one of these drives. For one thing, you're unlikely to encounter the dreaded "buffer underrun" problem CD-R drives used to have. In the old days, buffer underruns—momentary breaks that occurred in the data stream flowing from the PC to the CD recorder drive—ruined many a CD-R disc. In our tests, we didn't experience a single interruption, probably because today's recordable drives are faster, have bigger buffers in which to hold incoming data, and are used with PCs that have bigger and faster hard drives and faster CD-ROM drives, like our PMMX-200.

The hardest thing about making a CD may be deciding which of your drive's CD-creation software packages you should use. Almost every CD-R and CD-RW drive on the market today is standardized on Adaptec's Easy CD Creator, an application that uses a Windows Explorer–like interface to let you drag and drop the files you want to record. Most drives also come with a "packet-writing" utility, usually Adaptec's DirectCD—an alternative method for making data-only discs. (Packet writing doesn't work for music or mixed-media CDs.) Running behind the scenes, packet-writing software lets you use the real Windows Explorer—or another favorite file manager—to copy files to the CD.

SIZE MATTERS Teac's 4X12 is only two-thirds the size of the largest drives reviewed, making it portable.

Both types of creation software are super-easy to use—so which should you work with? Our advice in a nutshell: If you routinely back up very large files, stick with Creator. It's generally much faster and may save you some disc space. If you back up just a few files every day or merely want to write over parts of discs, use packet writing.

Packet writing lets you enjoy CD-RW's biggest advantage: the ability to selectively overwrite files. Unlike Creator, which forces you to erase the whole disc before you begin rewriting, packet writing lets you pick the files you want to delete, and reclaim disc space. Only two drives we tested—Smart and Friendly's CD-RW 226 Plus and Yamaha's CRW4001ti-PC—did not let us overwrite files. (Both companies said their software would support packet writing by the time you read this.)

But using packet writing has some drawbacks. Because a packet-writing application prepares the surface for possible overwrites later, it takes much longer than Creator to format a CD-RW disc. In our tests, it took up to an hour and a half to prepare a rewritable disc with Adaptec's DirectCD. Also, the formatting data gobbled up 150MB, almost a quarter of the disc's capacity. Formatting with Easy CD Creator, in contrast, cost us only a few minutes and a few megabytes.

Packet writing can really slow down CD-RW recordings, too. We found it could add up to almost half an hour. The moral: If you're writing big files or just doing backups, you might be better off not bothering with using packet writing with CD-RW discs. Instead, use Creator and two discs. When you fill up the ▶

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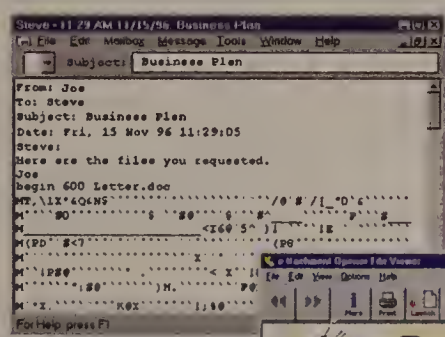

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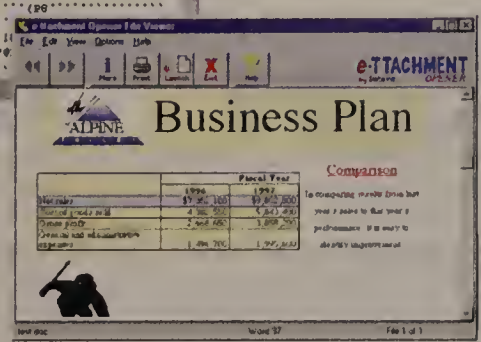

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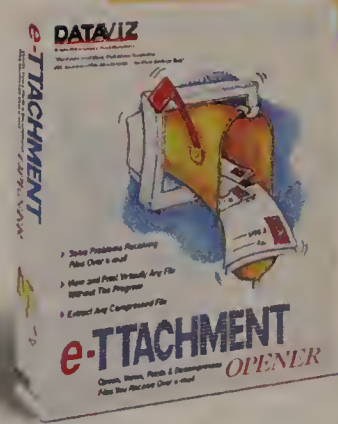

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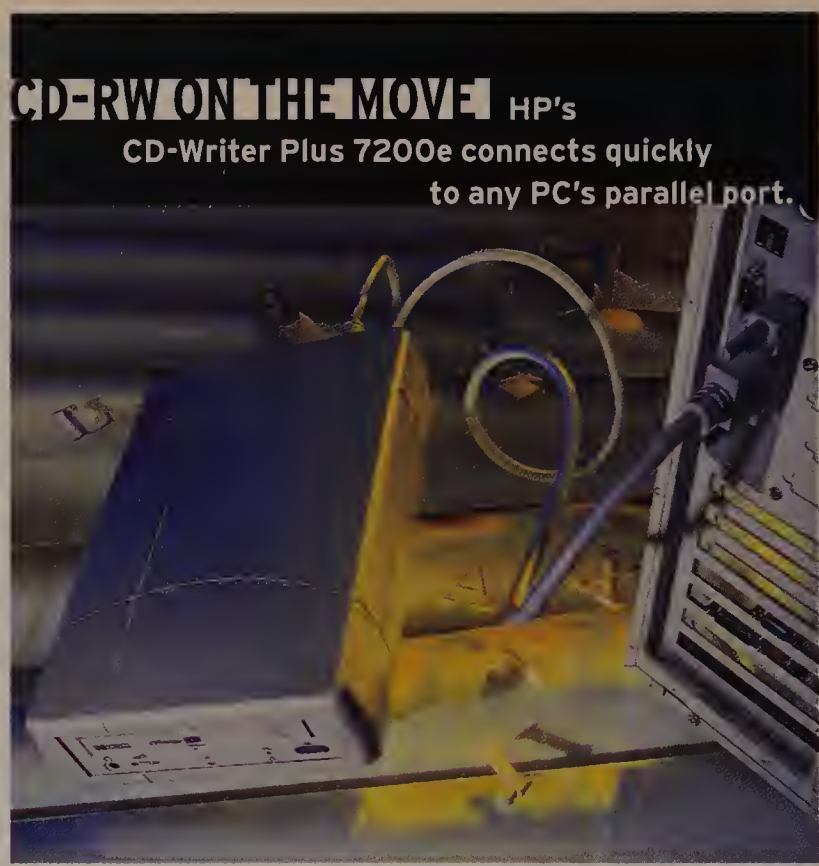
first disc, start on the second. When you fill the second, erase the first and start recording on that again.

And packet writing with CD-R discs? It works great as a simple backup tool. It's the easiest way to quickly drag just a few Word or Quicken documents to a CD-R disc every day, for instance. But you can't keep adding files to the disc and use it in a CD-ROM drive, too, as you can with Creator. Packet writing makes you "close" the disc before you use it, which means you can no longer write to it. Packet writing slowed down CD-R recording time, though generally not by very much. It took most of the drives about 5 minutes longer to copy 430MB of files to a packet-written CD-R disc than to one formatted with Creator. The exception was Mitsumi's CR-2801TE, which took over an hour. The only drives packet writing didn't slow down were the Plextors, which actually recorded to a packet-formatted CD *faster*. Plextor says it works closely with packet-writing software firm CeQuadrat to optimize its drives for packet writing.

EASY AS USING EXPLORER

WE TESTED EACH drive by creating three types of CDs: a data-only CD that contained 430MB of files, a music-only CD, and finally, a CD that mixed data and audio files.

Using the packet-writing programs for our data backups was simple: We just dragged files to the disc from Explorer. Creator was almost as easy. Each time we started it, a Welcome Wizard popped up, asking us if we wanted to make a data CD or an audio CD. To make a data CD, we simply used Creator's Explorer-like window to drag and drop the files we wanted to put on the CD into a window and clicked a button to start the recording process. Making our music CDs was also a snap. We just had to choose the *Audio CD* option in the Welcome Wizard, and Easy CD prompted us to put a music CD in a drive. After we selected tracks from several music CDs, we clicked a button, and Creator promptly began recording the tracks in order, pausing to allow us to switch music CDs as needed. You could also make a complete copy of a disc in one fell swoop. (Such copying is perfectly legal—as long as the recordings you make are for your own personal use.)



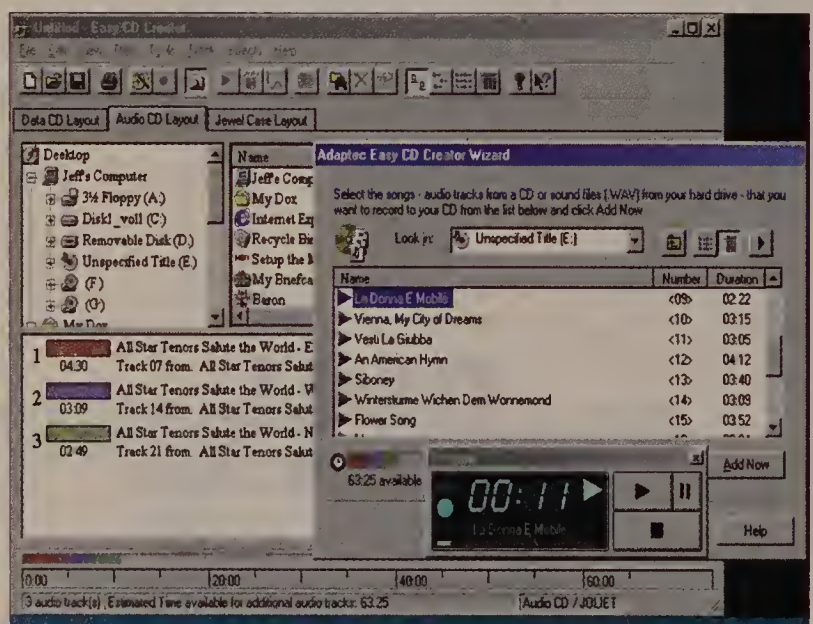
CD-RW ON THE MOVE HP's CD-Writer Plus 7200e connects quickly to any PC's parallel port.

In each case, before the actual recording began, Easy CD Creator first checked our PC's processor, hard disk, and CD-ROM to make sure they had enough oomph to do the job. Our PMMX-200 system passed with flying colors. If it hadn't, Creator would have given us the option to drop the record speed to as low as 1X. Creator asks you each time if you want to run the test; we recommend doing it the first couple of times you record a CD-R disc.

Easy CD Creator also lets you combine music and data on the same CD. It's handy for people and companies that want to put a mix of files—such as promotional literature, music scores, music tracks, and personal info—on the same CD. But this is one area in which Creator stumbled. Mixed CDs are not part of the Welcome Wizard—we found the option only when we inadvertently tried to copy a data file to a disc with audio tracks. A window popped up, asking us which mixed-mode option we wanted—Mixed-Mode or CD-Extra—without explaining the merits of each. (Most people should go for CD-Extra. Mixed-Mode puts the data tracks before the audio tracks on a CD; CD players will try to play the data tracks, resulting in a loud screeching noise that can damage speakers.)

Cool It If your drive's fan sounds like a jet engine, turn off the drive when not in use. To restart it, check the Restart button on Win 95's Device Manager.

Once we got past the mixed-mode option selection, the process became self-explanatory. We popped an audio disc in our CD-ROM drive and selected it in a dialog box. In another part of that box, we browsed data files located on our hard drive. We simply highlighted which audio and data tracks we wanted and clicked a button to send them to the CD-R disc.



PERSONAL GREATEST HITS: Copy music from multiple CDs onto a single disc using Easy CD Creator's Audio CD Wizard option.

BOUQUETS AND BRICKBATS

THE BIGGEST differences in the drives we tested are in performance, ease of setup, and support. But some also vary ▶

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Circle 187 on reader service card

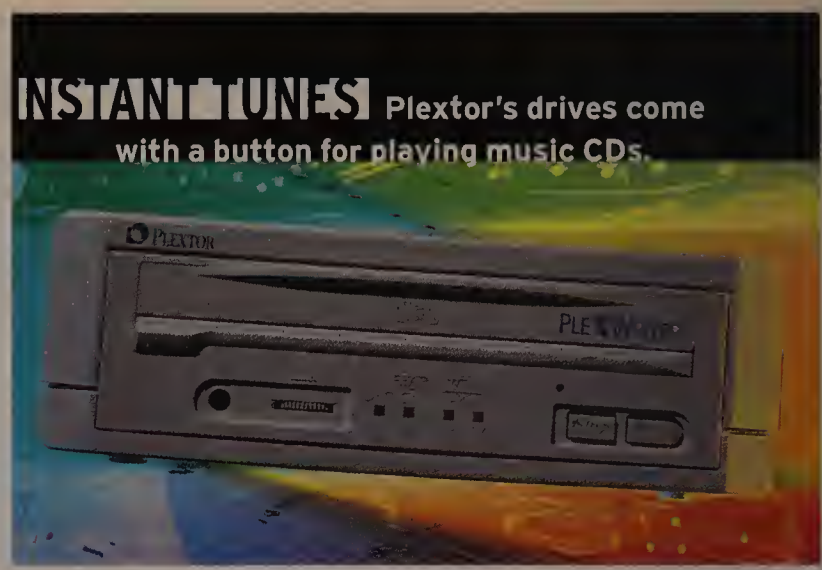
in size, range of bundled software, and how quietly they operate.

Most of the drives come with little or no software beyond Creator and DirectCD, but there are a few notable exceptions. HP's CD-RW models come with one of the best extra software bundles, including the Photo Deluxe image editor and Symantec's Norton AntiVirus utility.

Honorable mentions go to Smart and Friendly's CD-RW 426 Deluxe and to the Ricoh drives. The Smart and Friendly unit is the only one with the Deluxe version of Easy CD Creator. Creator Deluxe's Spin Doctor lets you make your own music CD off of records, tapes, and any other audio source. It has an easy-to-use and entertaining interface, and filtering tools to strip out pops, hiss, and scratches. Another bonus is Picture CD Creator, which lets you organize your digital photos in thumbnails so you can scan and arrange them into a slide show. The Plextor drives also come with a tool that lets you get music from a range of audio sources, but we found Spin Doctor easier to use.

We also liked Seagate Backup, a utility bundled with the Ricoh drives. It offers easy backup scheduling, gives you the option of backing up everything or only those files that have changed, and provides on-the-fly compression, allowing you to store up to a gigabyte on a CD.

Plextor went the extra mile in design. Besides their music CD player enhancements, the Plextors, along with the Sony Spressa, were the only ones with disc caddies—useful if you frequently swap discs.



INSTANT TUNES Plextor's drives come with a button for playing music CDs.

The remaining drives had only a few design problems. The disc tray on the Yamaha CRW4001ti-PC felt flimsy and didn't slide in and out smoothly. Smart and Friendly's CD-RW 426 Deluxe and MicroNet's Master CD Plus 4X12PC share the Homer Simpson Award for being the bulkiest and noisiest external drives of the lot. In contrast, the Teac and Verbatim drives easily fit in a briefcase.

CD-RW: GETTING FASTER, CHEAPER

CD-RW DRIVES should become better deals soon. According to Wolfgang Schlichting, research manager for removable storage at IDC, CD-RW prices should drop as much as 25 percent this fall. He also predicts that CD-RW will become more popular as an exchange medium as more CD-ROM drives with MultiRead ship this year. CD-RW drives will get faster, too. HP and Verbatim have announced drives capable of recording CD-RW and CD-R discs at 4X speed, and a few vendors promise 6X-record drives by year-end.

Even so, CD-RW's time in the limelight will likely be relatively short. If its ability to make and remake album-length CDs of music and data is compelling, the rewritable DVD drive may prove to be irresistible. When these drives finally hit stores en masse, the long-separated worlds of data, music, and video storage will find a home on the same super-capacious recordable medium.

Jeff Sengstack is a freelance author specializing in optical media. An ex–TV newscaster, he lives near Portland, Oregon. Lincoln Spector is a contributing editor for PC World. ■

PROS & CONS How Recordable Drives Stack Up

DRIVES	Price	Capacity	Media cost	Cost per MB (approximate)	Strengths	Drawbacks	Best uses
CD-R	$300-$700	650MB	$2	.3¢	Dirt cheap, good data integrity, runs in CD-ROM drives.	Can record only once, slow.	Distributing files, archiving, data file backups, copying music CDs.
CD-RW	$300-$700	650MB	$15	2¢	Good data integrity, low cost per megabyte.	Slow, limited compatibility.	Archiving, making editable recordings that combine data, audio, and video.
DVD-R	$15,000	4.7GB	$50	1.1¢	Only writable DVD format readable in DVD players.	Super pricey.	Creating master discs for DVD-ROM replication; strictly corporate.
DVD-RAM	$800	2.6GB or 5.2GB	$25 or $40	1¢ or .8¢	High capacity, good data integrity, very low cost per megabyte.	Pricey, limited compatibility.	Large file archiving and backups, making editable recordings that combine data, audio, and video.
Jaz/SyJet/Sparq	$300-$550	1GB/1.5-GB/1GB	$80/$80/$39	8¢/5¢/4¢	Fast, small disks.	Limited compatibility, less data integrity than optical.	Large-file and program sharing.
Magneto-optical	$1500	4.6GB	$170	4¢	High capacity, good data integrity, low cost per megabyte.	Limited compatibility.	Very-large-file archiving and backups.
Tape	$200-$500	2GB-8GB	$20-$35	.4¢-1¢	Very high capacity, very low cost per megabyte.	Tapes can break, very slow, less data integrity than optical.	Full system backups.
Zip/LS-120	$150/$150	100MB/120MB	$13/ $17	13¢/14¢	Small disks, Zip compatibility fairly widespread.	Less data integrity than optical; LS-120 less established in market.	File and small-application sharing.

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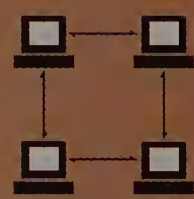

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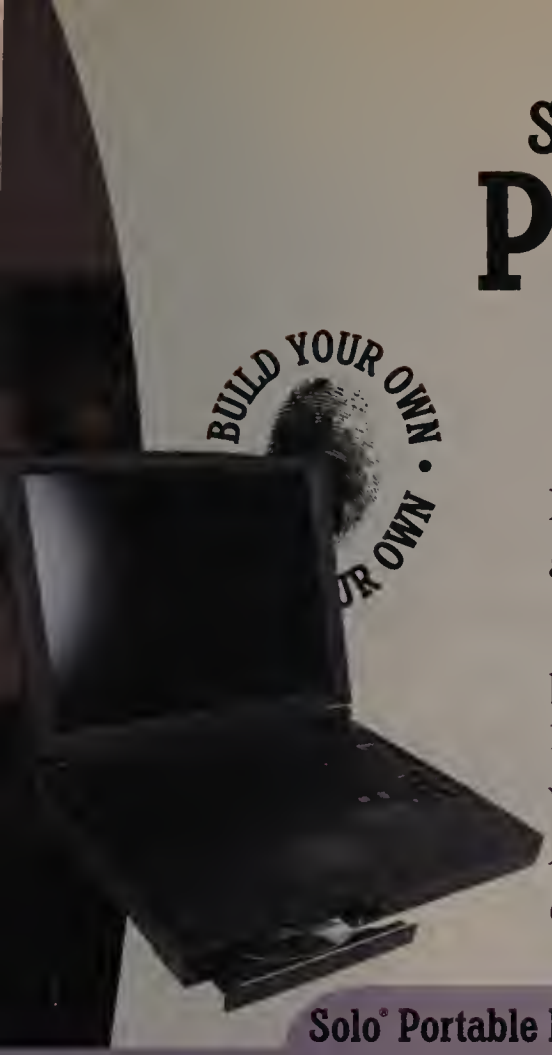

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THE PLUG-AND-PLAY Intranet

TIME WAS, you and your colleagues shared critical information via weekly staff meetings, Post-it notes, and paper memos. Not anymore. Product plans change weekly, your colleagues work in Cincinnati or Singapore, and you are choked in e-mail but starved for key documents. Your best hope for coping gracefully lies in an intranet, an extension of your company's network that exploits the Web's slick information-sharing tricks. Essentially, you build an internal Web site that's tailor-made for storing ▶

BY STAN MIASTKOWSKI

Starting at $1249, these five intranet appliances promise to make sharing information as easy as launching your browser.

ILLUSTRATION BY ROBERT ZIMMERMAN

crucial information that your company's employees can easily access. An intranet can make sharing documents a snap, whether it's the latest product information for marketing or an always-current policies manual.

Does building an intranet sound like a humongous task that only grizzled IS professionals can handle? Fortunately, it's not. A new class of plug-and-play server devices makes it easy for you to set up and maintain a basic intranet for your small business, workgroup, or department. Most of these appliances are less expensive than a desktop PC, with pricing typically under $2000, and can easily serve up to 100 users. We tested five such products for this review, with price tags ranging from $1249 to $7999.

STEVE TELLEEN

Intranet International

When Steve Telleen traveled to Kazakhstan to work with Tengizchevroil, a regional oil company, he took along the Compact Devices Twister Web appliance, but he didn't intend to spread the intranet religion. "If you are going to do training on an intranet, it's easy to bring the training site loaded on the box and then take it away with you afterwards," he says. But employees at the oil company liked the device's Webpage hosting capabilities so much they persuaded Telleen to leave it behind when his assignment was done. The Twister was set up in about 5 minutes and now serves as a training and development resource.

AT YOUR WEB SERVICE

INTRANETS-IN-A-BOX are designed as complete bundles of hardware and software, with automated setup and clear documentation that puts the project within reach of regular folks. They lack a keyboard, monitor, or mouse—instead taking their cues from any PC on the network. Inside each box is a processor, an operating system, a hard disk, memory, Web server software, and most or all of the other software needed to run an intranet site.

The five intranet machines here come with other applications such as tools for Web authoring, e-mail, and group discussions, plus tools for the intranet administrator and users in general. Most could be used as a public Web server but aren't designed for that role. One exception is Data General's powerful Thiin Line SiteStak Web Server. The versatile Whistle InterJet 100 includes Web browsing, e-mail, and even a network hub. We didn't run formal benchmarks, but in informal tests, all delivered almost instant intranet access on our sample workgroup. Performance shouldn't be an issue unless you plan to serve hundreds of employees.

CAN YOU ROLL YOUR OWN?

UNTIL THESE LITTLE BEASTS came along, setting up even a simple intranet was daunting, even if you had in place the basic infrastructure—an existing network running TCP/IP, and employees all outfitted with Web browsers. You needed to buy and install a reasonably powerful PC or low-end server, install Web-server software, build the intranet site with a Web authoring tool, and then grapple with a host of logistical issues. This route demanded plenty of expertise, time, and money.

PHOTOGRAPH (LEFT): ROBERT HAUSER, (RIGHT): KEN SMITH

INTRANET APPLIANCES — FEATURES COMPARISON

	KEY FEATURES					SOFTWARE			
INTRANET DEVICES	List price	Processor	RAM (MB)	Hard disk (GB)	Network interface	Operating system	Server software	Web authoring software	Other bundled software
Cisco Micro Webserver 200	$1595	133-MHz Power PC 603e	4	2.1	10Base-T	proprietary	Apache	none	none
Cobalt Qube	$1249	133-MHz MIPS RISC	16	2.1	10Base-T	Linux	Apache	Cobalt Web Page Builder	e-mail, discussion group, InfoPlace document organizer
Data General Thiin SiteStak TW-500 [1]	$7999	200-MHz Pentium Pro	128	4.2	10/100Base-T	embedded Windows NT 4.0 server	embedded IIS, FrontPage extensions	none	tutorials
Microtest WebZerver	$1595	133-MHz AMD 5x86	8	2.1	10/100Base-T	Linux	Apache	Microtest EazySite, NetObjects Fusion (trial version)	EazyTalk, EazySubmit, EazyPrint, EazyStyle, EazySite, EasyPage
Whistle InterJet 100	$1995	100-MHz 486	8	1.2	10Base-T	BSD/UNIX	Apache	Claris HomePage, NetObjects Fusion	EasySearch

[1] $3990 Thiin Line SiteStak Web Server TW-150 was unavailable at the time of review.

Intranet appliances can blow away these obstacles. Our hands-on tests showed that they allow average users to set up an intranet—if the machines go onto a properly configured TCP/IP-aware net. If you've set up a PC for Internet access, you already know most of the basics (see "Web Appliance Installation 101").

Ease of installation differs by product. In some cases, wizards and automated configuration make intranet setup a reasonable project for most experienced PC users. Other appliances require fairly in-depth knowledge of networking and Internet technicalities. Things get particularly tricky if your network doesn't set IP addresses via a Dynamic Host Configuration Protocol service.

Once your intranet is up, you must decide on directory structures and other document-sharing issues. And you'll need to make sure you train your colleagues in its use. While the EazyPrint feature on Microtest's WebZerver makes quick work of posting content, other devices require familiarity with FTP uploads and other Net arcana.

PICK THE RIGHT APPLIANCE

WE TESTED CISCO Micro Webserver 200, Cobalt Qube, Data General Thiin Line SiteStak Web Server, Microtest WebZerver, and Whistle InterJet 100. Two similar products were not reviewed: Compact Devices' Twister is no longer marketed to users, and Encanto's e.Go server hadn't shipped.

Which is the right product for you? That depends on many factors, including the size of your business and your application needs. The Whistle InterJet 100 is the ideal choice for a network with less than 25 users because of its no-hassle setup and bundle of virtually everything you need—including Internet access, Web site hosting, and e-mail. For larger intranets, the InterJet 120 and 200 provide the same features with extra muscle. If all you need is a powerful intranet site for up to 100 users, the Microtest WebZerver wins hands down with its easy administration and wide variety of built-in software. And for businesses requiring a large intranet and a server for a public Web site, the Data General SiteStak is the only choice here.

SPECIFICATIONS

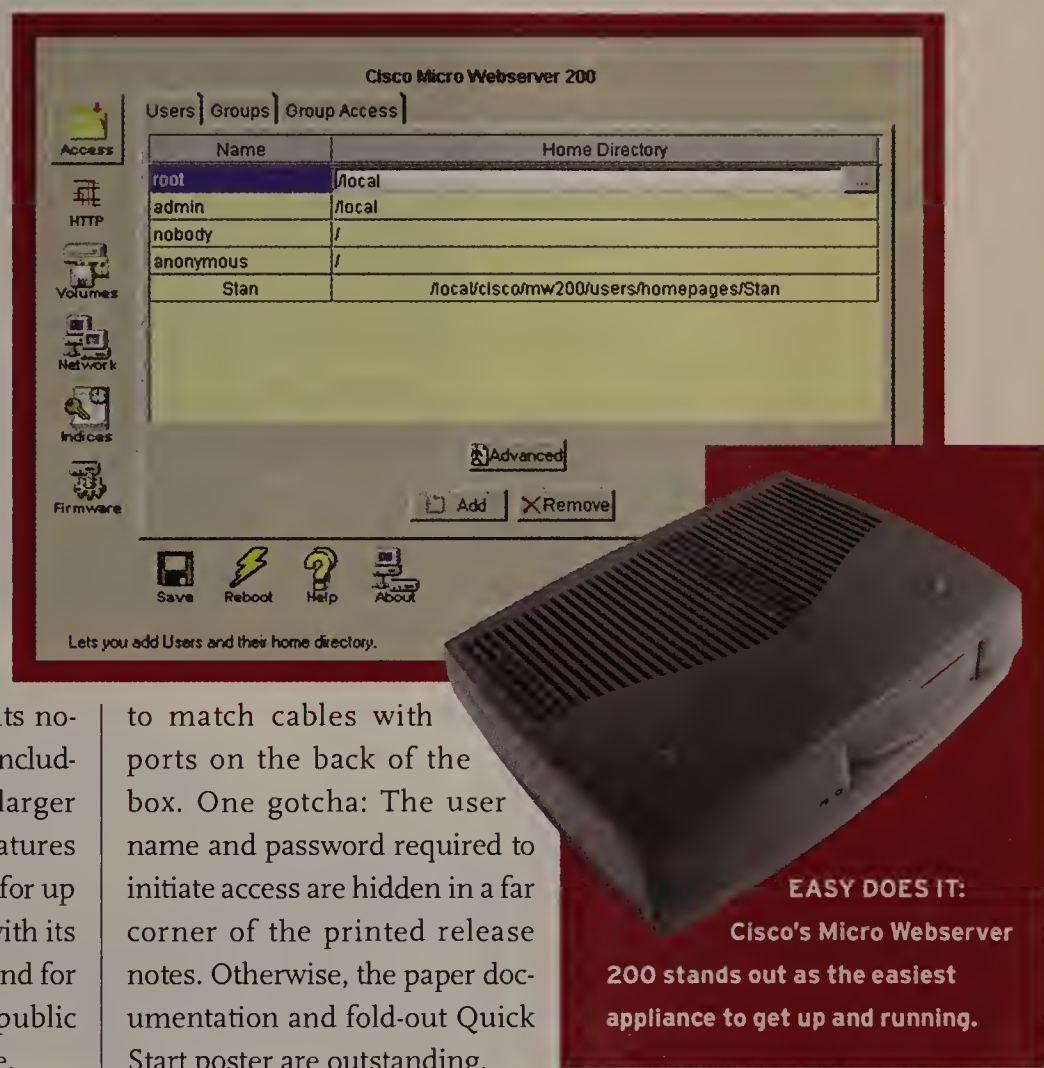
Maximum hits/second (vendor estimate)	Other features
50	fast SCSI connector
85	ActiveMonitor maintenance software, DNS service
450	multiple Web site support
50	administrator feedback form, news bulletins, site map, backup support
25	router for public Web hosting, automatic configuration, Web mirroring to ISP host, DNS and DHCP services

Cisco Micro Webserver 200

PRO: Easy setup; powerful enough to handle a large intranet.

CON: Limited Web site creation tools, only 4MB of memory.

FOR EASE OF SETUP and use, it's hard to beat the $1595 Cisco Micro Webserver 200—we had it running in a mere 15 minutes. Like all the units we reviewed, the Micro Webserver can set its network IP address automatically if Dynamic Host Configuration Protocol server software is running on your network. Even without DHCP, IP configuration is a breeze, thanks to a utility that does the job from any networked PC. Color-coded cables make it easy to match cables with ports on the back of the box. One gotcha: The user name and password required to initiate access are hidden in a far corner of the printed release notes. Otherwise, the paper documentation and fold-out Quick Start poster are outstanding.



EASY DOES IT: Cisco's Micro Webserver 200 stands out as the easiest appliance to get up and running.

Inside, the Micro Webserver 200 features a 133-MHz PowerPC 603e processor and a 2.1GB hard disk; it runs a proprietary operating system and Apache Web server software.

The 4MB of memory is the smallest amount in all the products reviewed here, but the unit is rated to handle at least 50 connections per second, which is enough to serve a couple of hundred users. A built-in SCSI port lets you add SCSI hard disks and CD-ROM drives, and you can stack up to five Micro Webservers together.

Java-based setup and administrative utilities use wizards to quickly step you through the process, including basic security for user access and file rights.

While the Micro Webserver lets you easily set up accounts and basic home pages for both individual users and the overall site, it doesn't include any advanced Web page creation tools. But you can easily send HTML content created in another application from a network PC to the Micro Webserver.

• **Micro Webserver 200;** $1595 list; Cisco Systems; 800/553-6387, 408/526-4000; www.cisco.com READER SERVICE NO. 704

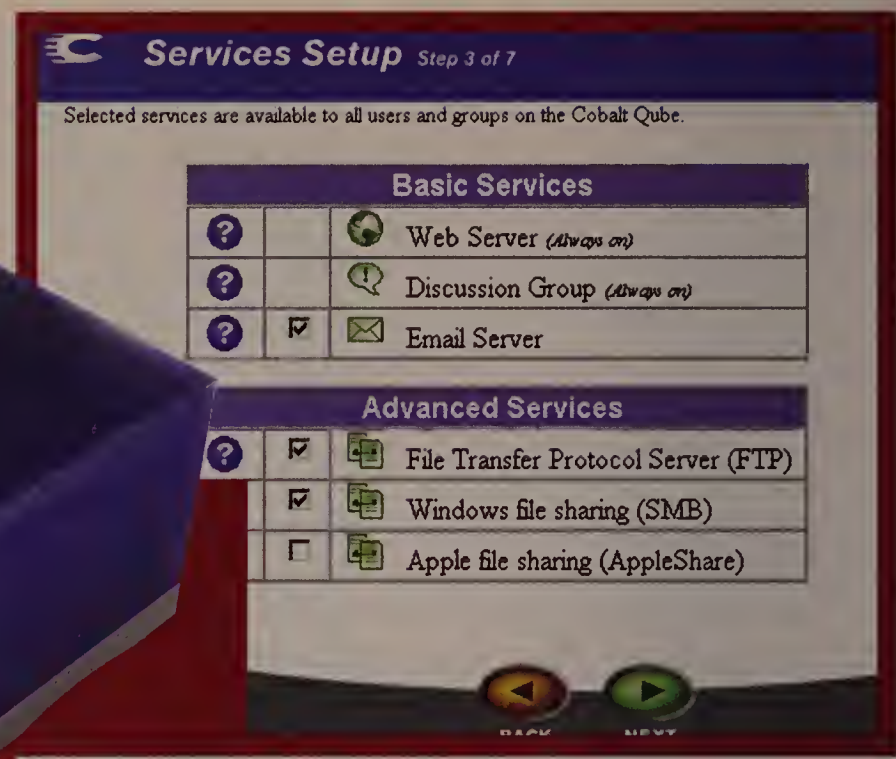
Cobalt Qube

PRO: Extensive features for intranet and Internet Web hosting, e-mail, discussion groups, and document management; inexpensive.

CON: Lowest-end model could use more memory.

WITH ITS DRAMATIC CUBE SHAPE and ominous, bright-green power light, the Cobalt Qube looks like something out of a science fiction movie. More important, the Qube packs enough horsepower to serve midsize intranets and even low-volume public Web sites. Integrated Web publishing, e-mail server features, discussion groups, and document management applications let employees collaborate on projects.

All three versions of the Qube use a 133-MHz MIPS RISC processor, the Linux OS, and Apache Web server software. The basic $999 model lacks e-mail and groupware features and comes with 16MB of memory and a 2.1GB drive. The $1249 midrange model, which we tested, has the same memory and hard drive, while the $1449 version uses 32MB of memory and a 6.4GB hard drive. Cobalt rates the midrange model for 85 simultaneous page hits per second—enough for very reasonable Web server duty. Our prerelease prototype of the high-end box lacked Cobalt's integrated Web Page Builder software, but we were able to post pages created in Microsoft FrontPage without a problem.



MULTI-TALENTED: Cobalt's Qube can handle public Web sites and remote access for your office.

The Qube will grab an IP address from a DHCP server, but manually setting the address can get a bit complicated: You must enter network information using push-button switches and a small LCD panel on the rear of the unit. But even without the complete documentation—not available at the time of this review—we could figure out the key sequences needed to enter the information. Once on the network, we were able to quickly set up users and groups and create a default home page for each.

Cobalt also touts the Qube as a lightweight public Web server, but the box lacks a router for connecting to the Internet; a router-equipped version is expected later this year.

• **Cobalt Qube**; $1249 list (as tested); Cobalt Microserver; 650/930-2500; www.cobaltmicro.com

READER SERVICE NO. 705 ▶

Web Appliance Installation 101

THANKS TO new intranet Web devices, you don't need an engineering degree to set up an intranet in your office. Here's a basic look at how to get one up and running in five fairly easy steps.

[1] Check it out. Before you set up an intranet box, make sure your local-area network properly supports TCP/IP. You must also set aside a unique TCP/IP address for the intranet appliance. If your network server is already running the Dynamic Host Configuration Protocol service, which automatically assigns IP addresses, your setup will be much easier.

[2] Plug it in. All intranet devices have RJ-45 ports for plugging into your network using standard 10Base-T ethernet twisted-pair cabling. Shut down the network and turn everything off, then connect your intranet box to the network hub or switch using a twisted-pair patch cable. (Note that most devices don't provide this cable.) Don't forget to plug in the power cord.

[3] Turn it on. Restart all the systems on your network, making sure everything is working before you power up the intranet device. If your network supports DHCP, the intranet device will automatically get a TCP/IP address. Otherwise, you'll have to assign that address manually from one of the PCs on your network. Follow the directions packed with your Web appliance.

[4] Set it up. Every Web device has a setup program that lets you configure your newborn intranet from a networked PC. You must set parameters such as user accounts, directory access, e-mail, and security before users can access and create documents on the intranet.

[5] Make it so. Now for the real work—building an intranet. Create your private Web site using tools built into your intranet device or with an off-the-shelf application like Microsoft FrontPage or Adobe PageMill—and you're open for business. -S.M.

PHOTOGRAPH: KEN SMITH; ILLUSTRATION: ROBERT ZIMMERMAN

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Data General Thiin Line SiteStak Web Server

PRO: Powerful NT-based integrated Web server for large or multiple sites.

CON: Expensive for intranet-only use in small installations.

DATA GENERAL'S Thiin Line SiteStak Web Server only looks thin. Inside the tiny box is a Pentium Pro processor and Windows NT server with Internet Information Server software. The TW-150 model costs $3990 and uses a 166-MHz CPU, 64MB of memory, and a 2.1GB hard disk. The TW-500 costs $7999 and has a 200-MHz CPU, 128MB of memory, and a 4.2GB hard disk. The TW-500 targets large corporations and Internet service providers—Data General claims the device can manage up to 1000 Web sites, 160,000 Web pages, and 450 hits per second. We tested this model, as the TW-150 was not available.

There's no paper documentation—a card in the packaging points you to the Thiin Web site for instructions. We would have preferred a printed manual, but we found the SiteStak very simple to configure. Separate directions address setup with and without a DHCP server on the network. (If no DHCP server is present, you must download a setup utility from the Thiin Web site, run the utility, fill in the IP address and other information, and restart the device.)

Creating individual Web sites is a matter of giving each site a name and allocating disk space, and establishing user accounts and security takes just minutes. One nice feature: The SiteStak supports Microsoft FrontPage server extensions, which lets users publish complex, interactive elements using FrontPage's excellent wizards.

The SiteStak may be a Web-serving dream machine, but it doesn't do everything. The unit lacks group-collaboration software, and a system this pricey should include a router for serving external Internet sites. Also, the built-in cooling fan is extremely loud, meaning you may need to relegate the SiteStak to a network equipment closet or other space where the noise won't disturb local users.

• **Thiin Line SiteStak TW-500;** $7999 list (as tested); Data General; 508/898-4000; www.thiin.com READER SERVICE NO. 706

Digital Schoolyard

No more pencils, no more books, lots and lots of Web-page looks. Bill Ragsdale, a computer teacher at Harvest Park Middle School in Pleasanton, California, didn't wait for the school district's information systems folks when he installed a Compact Device Twister. Providing a schoolwide intranet to over 150 systems shared by some 1300 students and staff, the device changed the way the school works.

"I try to build the Web into everything I do," explains Ragsdale. "Right now the journalism class is in my computer lab—they're publishing the newspaper on the Web. The art class is publishing their stuff on the Web, and the math class is putting their assignments up too. Basically, it is taking over the whole school and how it operates." Students post homework and projects to the server, and teachers have begun distributing their class assignments over the school intranet.

The rest of the district is still waiting for Web services to arrive, but Ragsdale is already upgrading to a Cobalt Qube: "I understand the Cobalt is easier to use, and it's also prettier."

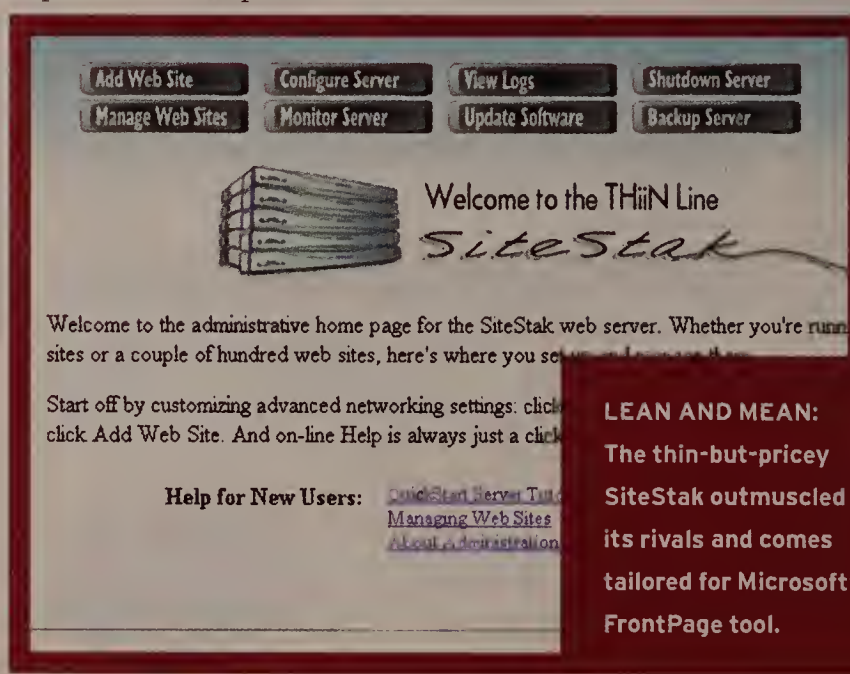
Microtest WebZerver

PRO: Extensive Web creation tools and utilities, easy to use, EazyPrint printer driver can post pages from any application.

CON: Setting IP addresses is too complex on non-DHCP networks.

THE $1595 MICROTEST WEBZERVER is a surprisingly complete, focused, and easy-to-use intranet solution. Its built-in wizard-based Web page creation tool—dubbed EazySite—lives up to its name in spades. Within a half-hour of opening the box, our basic Web site was in operation.

The EazyPrint feature alone makes the WebZerver an attractive buy. It lets users post virtually any document—from any application—to the server in HTML format. Working much like fax software, EazyPrint acts as a printer driver installed on client PCs. The user sim- ▶



LEAN AND MEAN: The thin-but-pricey SiteStak outmuscled its rivals and comes tailored for Microsoft's FrontPage tool.

PHOTOGRAPH (TOP): ROBERT HAUSER; (BOTTOM): KEN SMITH

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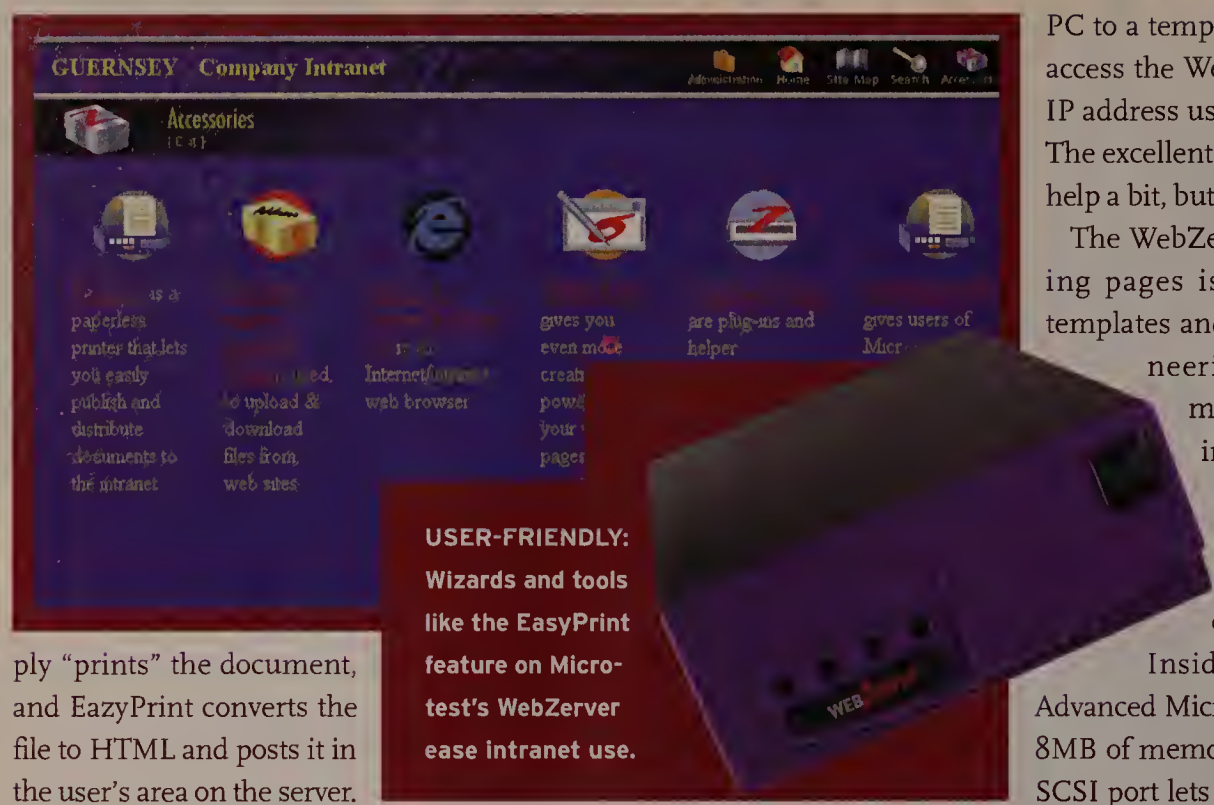


USER-FRIENDLY: Wizards and tools like the EasyPrint feature on Microtest's WebZerver ease intranet use.

ply "prints" the document, and EazyPrint converts the file to HTML and posts it in the user's area on the server. The process makes Web page posting easy, quick, and flawless.

Not so easy is assigning an IP address on networks lacking a DHCP server. The most reliable approach is to set a networked PC to a temporary IP address, then use the PC to access the WebZerver and switch to a permanent IP address using the device's configuration utility. The excellent start-up manual and TCP/IP tutorial help a bit, but nontechnical users may be stumped.

The WebZerver offers basic security, and creating pages is a breeze thanks to the sample templates and prefab layouts for topics like engineering, finance, human resources, manufacturing, and marketing. Also included are a discussion application and a search engine, as well as an FTP program for loading files to the WebZerver. You can also use your own Web creation tools.

Inside the WebZerver is a 133-MHz Advanced Micro Devices 5x86 CPU running Linux, 8MB of memory, and a 2.1GB hard disk. A built-in SCSI port lets you connect extra SCSI devices such as hard disks and CD-ROM drives. The company claims the WebZerver can handle up to 50 hits per second—plenty of capacity for midsize workgroups and departments. • **WebZerver; $1595 list;** Microtest; 800/526-9675, 602/952-6400; www.microtest.com READER SERVICE NO. 707 ▶

Building an Intranet... Without the Box

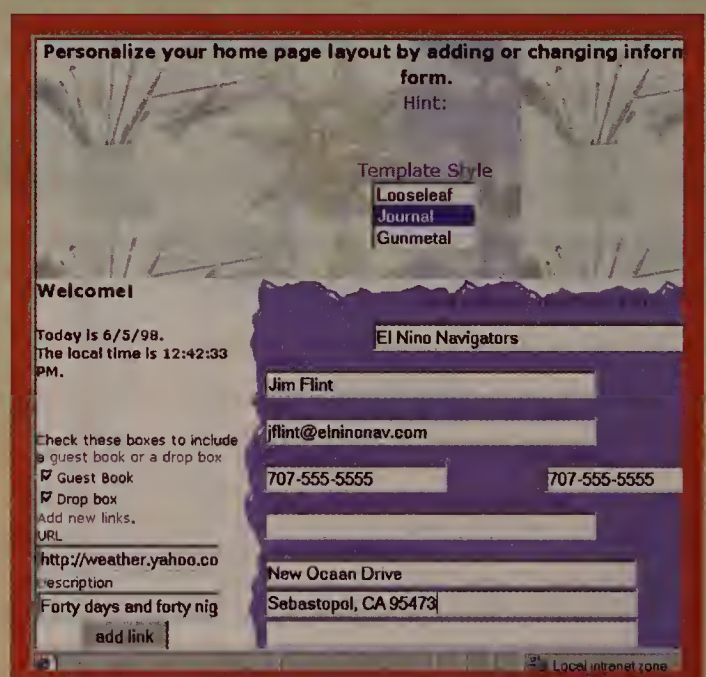
SO YOU WANT TO create an intranet for your workgroup but don't want to splurge on hardware? Check out Microsoft's free Personal Web Server 4.0 and 60-Minute Intranet Kit, which help you create an intranet on Windows 95 or NT PCs.

We tried out this build-your-own approach with a MidWest Micro Pro 333L PC with a Pentium II-333 CPU, 64MB of memory, a 4.3GB hard disk, and NT Workstation 4.0. At $1999 sans monitor, this offered far more raw power than any appliance in its price range. We chose the Microsoft tools because most alternative software packages get costly. We installed a network card into the Pro 333L (triggering a glitch that required completely reinstalling NT) and plunged bravely ahead.

THIS TIME IT'S PERSONAL

AN UPDATED VERSION of the simple Web server bundled with Microsoft FrontPage, Personal Web Server 4.0 uses a series of wizards to let you create a basic home page, add links, and post documents on your PC without a Web authoring package. The software will be bundled with Windows 98 and is available online at backoffice.microsoft.com/downtrial/optionpack.asp. (Be warned: It's packaged clumsily in a huge 27MB NT options pack.) Installing and running PWS is straightforward.

PWS comes in separate versions for Windows 95 and NT Workstation. The Windows 95 release won't act as an FTP server, let anyone but you post or update documents, or allow you to put those documents anywhere except on your local hard drive. It can't turn a Windows 95 PC into a serious intranet contender.



PERSONAL WEB SERVER lets you create a simple intranet home page using forms and friendly wizards.

TEMPLATES WITH ROOM

YOU CAN BUILD far more polished and powerful intranet applications with the Microsoft Office 60-Minute Intranet Kit available at www.microsoft.com/office/intranet/. At 14MB, it's another big download (you can also order a CD-ROM version). You get 12 predefined intranet applications, including templates for tracking revenues, posting press releases, and distributing news through push channels. You can get a basic intranet set up in an hour, but you'll need more time to really get working. You also need familiarity with FrontPage and a FrontPage-compatible server, and some applications require substantial expertise and other Microsoft tools.

—Stan Miastkowski and Eric Bender

PHOTOGRAPH: KEN SMITH

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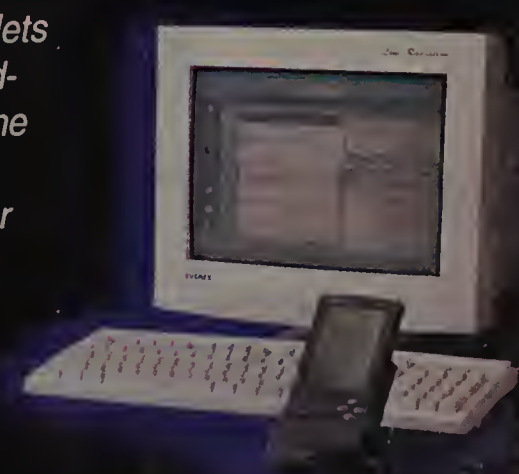

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JOE DIAZ AND JEFF STANLIS

Real-World WebZerving

Joe Diaz and Jeff Stanlis are too busy as executives at RCG Capital Markets Group, a financial relations consulting firm in Phoenix, Arizona, to struggle with complex network equipment. But they needed a way to share documents among the 11 employees on the company's local area network. "We wanted to set up a system where we could put up as much information as we could online. We also wanted to facilitate discussions," explains Diaz. "We don't have a real techie staff here, so we didn't want anything that was too complicated."

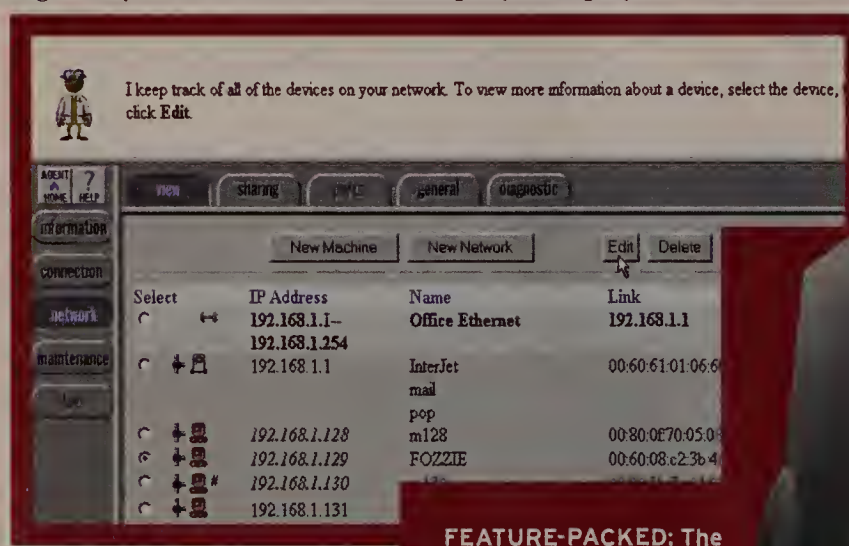
The Microtest WebZerver, with its print-to-HTML facility and automated setup, fit the bill. "We were posting content within 15 minutes," says Diaz. "Within two days, we had enough content that we could go show it to the rest of the office."

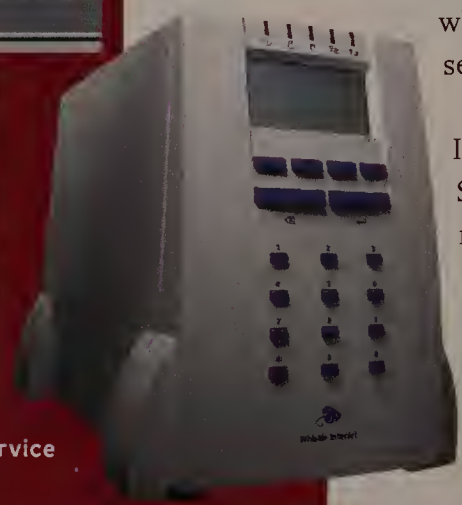
Whistle InterJet 100

PRO: Easiest setup; features include public Web site support and e-mail.

CON: No SCSI port for expanding storage.

MORE THAN JUST AN INTRANET BOX, the $1995 Whistle InterJet can act as a public Web server, as an e-mail server, and as a gateway to the Internet for a company's employees.





FEATURE-PACKED: The Whistle InterJet handles everything from e-mail service to Internet access.

The device comes in four models. The InterJet 100 we reviewed serves networks of up to 25 users, runs the BSD/UNIX operating system and the Apache Web server, and includes a 100-MHz 486 processor, a 1.2GB hard disk, and 8MB of memory. The only device here with a built-in router, the InterJet nonetheless is rated for a meager 25 hits per second—the lowest in this review. It does include its own DHCP server and Domain Name Server service for translating IP addresses into names, as well as a 33.6-kbps modem and a four-port hub. The $2695 InterJet 120 is designed for up to 100 users and can employ either a standard 33.6-kbps modem or an ISDN connection. The $2995 InterJet 140 adds a built-in ISDN adapter. The top-of-the-line $3495 InterJet 200 also handles up to 100 users and is designed for a full-time Internet connection using a high-speed, dedicated Switched 56 or T1 telephone connection.

The InterJet's software suite is well rounded, featuring both Claris HomePage and the powerful NetObjects Fusion package for Web site creation. Netscape Navigator 3.02 and Eudora Lite e-mail software are also provided.

If you're tapping the InterJet's Internet connection features, be aware that it works only with an ISP that specifically supports the device (a list of such ISPs is available at Whistle's Web site). Once you've set it up with an ISP, the InterJet dials in and configures itself, and the included client software lets you access it from either your network or the Web. The InterJet also handles security through a built-in firewall that keeps anyone who is unlawfully accessing your Web server off your local network.

With all that's built into it, the Whistle InterJet is an almost unbeatable deal. Small businesses that are just getting networked will find the device a painless way to set up e-mail, intranet services, companywide Web access, and a modest starter Web site.

- **InterJet 100;** $1995 list (as tested); Whistle Communications; 888/494-4785, 650/577-7000; www.whistle.com

READER SERVICE NO. 708

For more on running an intranet, visit www.pcworld.com/june98/intranet. Stan Miastkowski is a PC World *contributing editor. Eric Bender is an executive editor at* PC World.

For more information on all products in this article, circle reader service no. 906. ■

PHOTOGRAPH (ABOVE): REED RAHN; PHOTOGRAPH (BELOW): KEN SMITH

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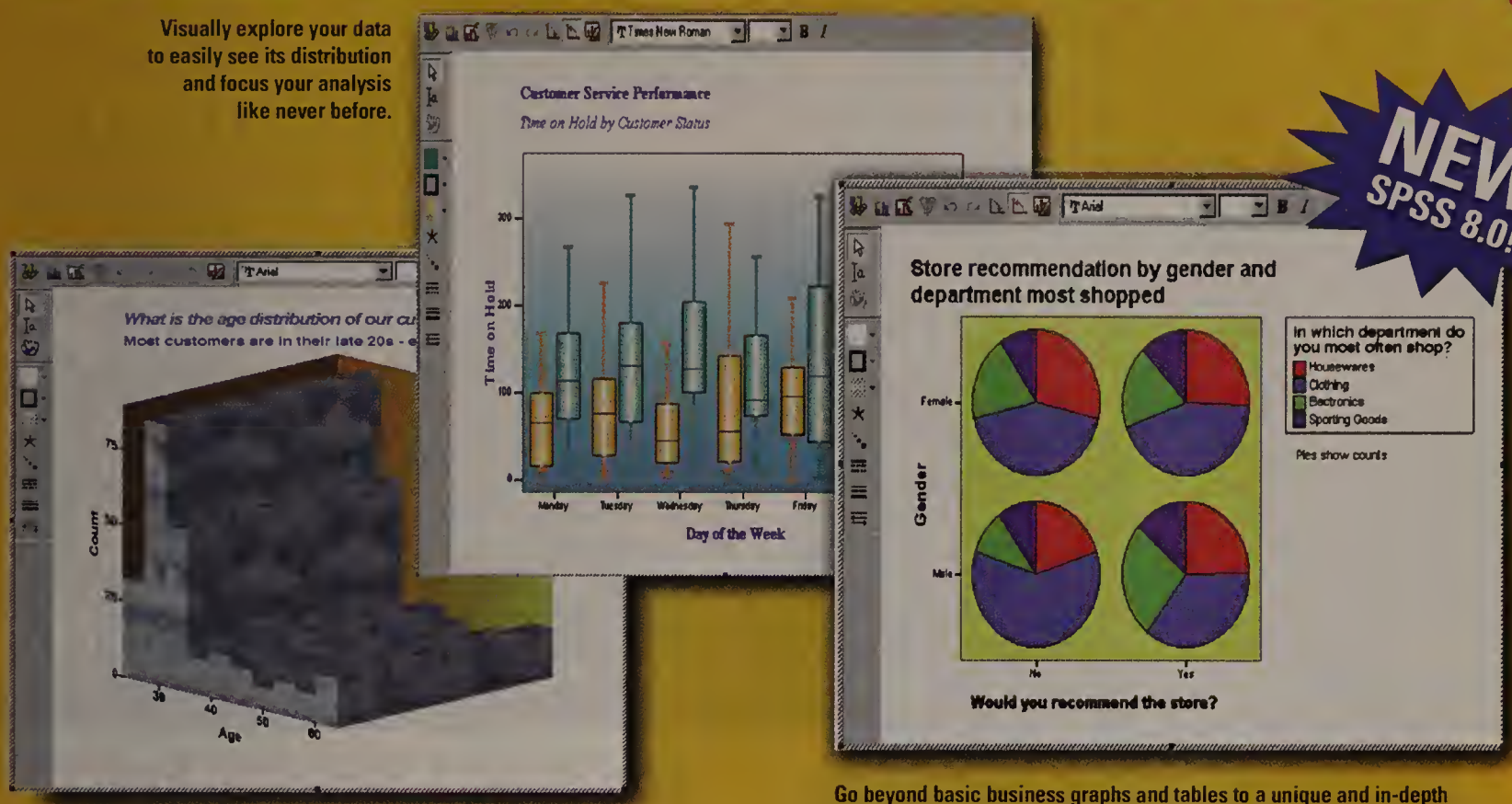

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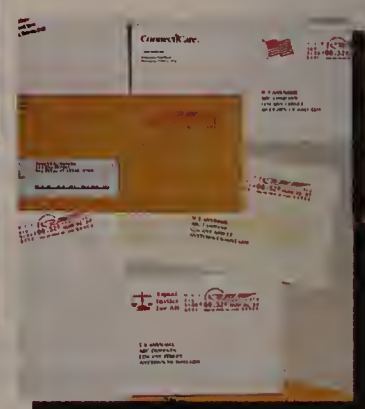

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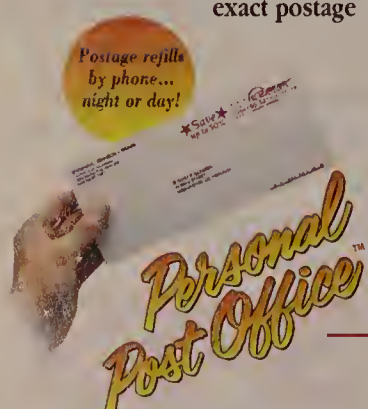

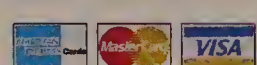

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[1]16X Max CD-ROM drive data transfer rates may vary from 1200 to 2400 Kbps. [2]The K56flex protocol is designed only to allow faster downloads from K56flex compliant sources. Maximum achievable download transmission rates currently do not reach 56 Kbps and will vary with line conditions. [3]14X Max CD-ROM drive data transfer rates may vary from 1200 to 1800 Kbps. All Compaq products sold at Compaq Works are refurbished unless otherwise noted. Our selection of refurbished products includes customer return units, evaluation units, cosmetically blemished products and older discontinued products. All refurbished products are retested at Compaq, where replacement of components is made, if necessary, to bring the product up to fully functional condition. All refurbished products carry a 90-day, limited warranty and may be taken to any Compaq Authorized Service Agent for service. All excess new products carry the Compaq standard limited warranty. For a complete copy of our warranties, please write Compaq Works, 10251 N. Freeway, Houston, TX 77037. Product availability limited to products on hand. All prices shown are Compaq Works prices and do not include applicable state and local sales tax or shipping to recipient's destination. All sales FOB Houston. Prices subject to change. Compaq Works shall not be liable for technical, pictorial or editorial errors or omissions contained herein. Compaq, Presario and the Compaq logo are registered in the U.S. Patent and Trademark Office. The Intel Inside logo and Pentium are registered trademarks and MMX is a trademark of Intel Corporation. Other product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. © 1998 Compaq Computer Corporation. All rights reserved. PCW0698

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A monthly update of the best desktop PCs, notebooks, printers, monitors, graphics boards, and modems

PC WORLD

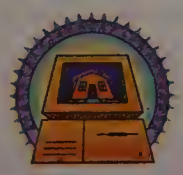
TOP 100

230 Power Desktops

240 Budget Desktops

248 Notebooks

252 Home PCs



255 Printers

259 Monitors

261 Graphics Boards

263 Modems

PENTIUM II-333S:

The Next Hot Deal?

EDITED BY JoANNE ROBB, ANDREW BRANDT, AND REX FARRANCE

A NEW WINNER: Gateway's G6-333 takes the coveted first-place Best Buy on the power chart.

WANT AN EXERCISE IN FUTILITY? Try owning a cutting-edge personal computer. With Intel rolling out new chips so often these days, the top-of-the-world feeling you get from buying a PC equipped with the latest processor is more fleeting than fame. Worse, you can

LIGHTNING STRIKES: Tagram's Thunderbolt is the first Pentium II-333 on the budget chart.

get burned if the price of your new system drops through the floor right after you buy it.

Now that new CPUs appear every two or three months, assuming a wait-and-see attitude toward buying a PC is not a bad idea. Take PCs based on Intel's Pentium II-333 chip. Unlike last fall's PII-300 systems, which were out for four months before price cuts moved them into the majority on our charts, the still-new PII-333s are already poised to become the Next Great Deal. At an average price of $2800, PII-333 systems already claim half the spots on our Top 20 Power Desktops chart, only two months after the first one cracked the list (April's $2487 NEC Direction SPL 333). And the release of 350- and 400-MHz power desktops should knock several hundred dollars more off the prices of both PII-333 and PII-300 machines (see "400-MHz Pentium IIs: Do You Need the Speed?" in this issue).

We heard the first rumbles of an impending price landslide this month when prices for PII-333 and PII-300 systems from companies like Micro Express and Kingdom dropped by an average of $260. But the cheapest PII-333 PC we've seen so far is the brand-new Tagram Thunderbolt H2630 PII333, at $2199.

Look for our first complete evaluations of shipping PII-350 and PII-400 systems in next month's Top 20 review. Prices on some machines from big vendors such as Dell are expected to start well under $3000, so it's a good bet that PII-350 and PII-400 PCs will quickly push their way toward the top of our power chart.

GATEWAY'S DOUBLE-HEADER

THIS MONTH Gateway takes the number one Best Buy on both the power and budget desktop charts, displacing longtime chart topper Dell on the power Top 20. Dell's Dimension XPS—first-place power PC in May—is still highly recommended at number two, but Gateway's new G6-333 surpasses it with a better price and quicker performance. At $2684, the G6-333 is $115 cheaper than the XPS D333—and it

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. System charts are divided by price. Power desktops cost $2250 or more; power notebooks cost $2750 or more. We compare new products to previously reviewed hardware, updating the charts to reflect price cuts and other changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of *PC World* readers and anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

Check out *PC World*'s Top 400 reviews online. Go to PC World Online (www.pcworld.com/hardware/t2010) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 categories. You'll also find reviews not available in print.

doesn't skimp on configuration. The G6 matches or exceeds the XPS's hard drive and monitor size, and it has essentially the same graphics card and an identical 2X DVD-ROM drive. The G6-333 is currently the fastest Win 95 unit on the chart: Its scorching PC WorldBench 98 score of 179 is 8 percent higher than the Dell's 164.

This month, Gateway takes number one Best Buy on both the power and budget charts, displacing longtime chart topper Dell on the power Top 20.

A note on Gateway performance: Last month we footnoted the Gateway E-3110 300's PC WorldBench 98 score because it was unusually high for its processor class. This month we discovered that Gateway had loaded the system with a relatively new service release (SR1) of Microsoft's Office 97. It's a later version than the one we use for our benchmark tests.

According to Microsoft, SR1 is simply a bug fix. But buried in it are some tweaks in the way Microsoft Word handles spell-checking, pagination, and a few other tasks. The result is lower CPU utilization when our benchmark runs these tasks—and that translates into higher PC WorldBench scores. This information will probably surprise a number of PC vendors. Few of those that sent us new PCs bundled with Office 97 had installed SR1.

Starting with the July issue of *PC World*, we will use Office 97 SR1 in all the systems we test. Why? First, to make sure all of them compete on a level playing field. We always make every effort to test PCs with the same version of all six PC WorldBench applications. Second, SR1 is the version of Office 97 that Microsoft currently sells at retail. If you're interested in SR1, you can get more information at www.microsoft.com/office/office97/servicerelease/faq.htm.

BUDGET PCs CRANK IT UP

ON THE HEELS OF SIGNIFICANT price cuts, Pentium IIs more than doubled their presence on this month's budget chart—mostly at the expense of Pentium MMX- and AMD-based PCs.

In fact, five Pentium II-300 systems and one Pentium II-333 unit earned budget-chart positions. Most notable, of course, is Tagram's Thunderbolt H2630 PII333, which parlays great performance, a generous complement of memory and storage, an internal Zip drive, and a $2199 price tag into a seventh-place finish.

The odd processors out this month are from AMD, with just two PC entries this month (down from six in May). The company still succeeds in selling its K6-233 CPU to vendors interested in making low-cost PCs, but it's having trouble bringing enough of the more potent K6-266 chips to market to compete in standard business-class systems.

By the time you read this, Dell and some other big vendors are expected to be phasing out their lower-end Pentium MMX processors and switching to all–Pentium II lineups for their desktop PCs. The good news for desktop buyers is that these companies will provide more-powerful 233- and 266-MHz PII systems for about what a similar-grade Pentium MMX machine had cost before the changeover.

NEW FACES ON THE PERIPHERALS FRONT

THOUGH THEY AREN'T changing as fast as desktop systems, color ink jet personal printers come close. The most notable of the new models we examined this month is Lexmark's 5700 Color Jetprinter. It earned our Best Buy on the strength of its fine output, an attractive $249 price, and great ease of use.

The Alps MD-1000 is another intriguing new color printer. This model uses the alternative printing technique of embedding dry ink in ribbons. In our tests, it produced very precise text printouts but less than sterling graphics output, which helped keep it off our Top 10 Personal Printers chart.

We also looked at the 3Com U.S. Robotics 56K external modem—a Best Buy this month. Besides using 3Com's x2 technology, this unit incorporates the new 56-kilobits-per-second V.90 standard. Though V.90 is promising, it's still being developed: Don't expect it to resolve the x2-versus-K56flex rivalry until later this year.

FIRST V.90 MODEM: The 3Com U.S. Robotics 56K Faxmodem (left) is a Best Buy. Alps' dry-ink printer misses the Top 10.

JoAnne Robb and Andrew Brandt are associate editors and Rex Farrance is a senior associate editor for PC World. *Staff Editor Grace Aquino, Associate Editor Vince Bielski, Assistant Editor Mick Lockey, and freelance writers Nancy Canning, Jon L. Jacobi, Carla King, and Gordon Meyer contributed to the Top 100. Testing for the Top 100 was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, and Mike Salayko of the PC World Test Center. See page 14 for contact information.*

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (3/11/98)	CPU	Comments
1	Gateway G6-333 800/846-2000 www.gateway.com	n/a	NEW	$2684	Pentium II-333	Fastest Windows 95 PC has 2X DVD-ROM drive, lots of software.
2	Dell Dimension XPS D333 800/388-8542 www.dell.com	1	May 98	$2799	Pentium II-333	$130 price drop helps keep loaded PII-333 high on list; 2X DVD-ROM drive.
3	Gateway E-3110 300 800/779-2000 www.gateway.com	3	May 98	$2585	Pentium II-300	$163 price cut on quick, loaded PII-300 with 19-inch monitor, ethernet adapter.
4	Quantex QP6/300 SM-4x 800/896-4898 www.quantex.com	5	May 98	$2449	Pentium II-300	Well-stocked PII-300 dips another $100 this month, comes with big monitor.
5	NEC Direction SPL 333 888/863-2669 www.necnow.com	12	May 98	$2487	Pentium II-333	Nicely designed midtower has a good price considering its PII-333 CPU.
6	Unicent Avanta L333 800/308-3614 www.unicent.com	n/a	NEW	$2399	Pentium II-333	Low-cost PII-333 has fine components and generous warranty.
7	NEC PowerMate Enterprise 8000 888/863-2669 www.necnow.com	16	May 98	$2898	Pentium II-333	Quick PC lacks a modem but has ethernet; scoring adjustment from last month.
8	Dell OptiPlex GXa 266 800/289-3355 www.dell.com	11	May 98	$2434	Pentium II-266	Corporate PC with LAN adapter is easy to upgrade, fine reliabillity and support.
9	Quantex QP6/300 SM-4xSE 800/896-4898 www.quantex.com	13	May 98	$2549	Pentium II-300	Slightly slow Pentium II-300 comes with 2X DVD-ROM drive and 56-kbps modem.
10	HP Vectra VL Series 7 800/322-4772 www.hp.com	8	May 98	$3030	Pentium II-333	With Windows NT, this corporate PC is among the fastest we've ever tested.
11	Premio Shadowhawk LX PII 333 800/677-6477 www.premiopc.com	n/a	NEW	$2631	Pentium II-333	PII-333 has Office Professional, fine sound card; support policies could improve.
12	Sys Technology Sys Performance Pro 300LA 800/613-9963 www.systechnology.com	14	May 98	$2610	Pentium II-300	$181 price drop on very fast PII-300 with high-class components; tested with NT 4.0.
13	Sys Technology Sys Performance Pro 333H2 800/613-9963 www.systechnology.com	n/a	NEW	$3257	Pentium II-333	Well-configured PII-333 is quickest on chart; tested with NT 4.0.
14	NexTrend NexStar-600W 888/838-7827 www.nextrendpc.com	n/a	May 98	$2499	Pentium II-333	$200 price cut puts this fast Windows 95 PII-333 on chart; good sound card.
15	Quantex QP6/300 SB-4x 800/896-4898 www.quantex.com	n/a	May 98	$2299	Pentium II-300	$200 price drop boosts this powerful business PC; tested with Windows NT 4.0.
16	HP Brio PC 8379 800/533-1333 www.hp.com	10	May 98	$3080	Pentium II-300	Price up $563 on well-built PII-300; HP priced it without monitor last month.
17	CompUSA American Pro Ap333L-SE 888/226-6772 www.compusa.com	n/a	NEW	$2999	Pentium II-333	Loaded PII-333 is a fine Windows 95 performer; 2X DVD-ROM drive, office software.
18	Everex StepStation 2 P2-300 800/383-7391 www.everex.com	20	May 98	$2550	Pentium II-300	Plain-Jane Pentium II-300 comes with NT plus crisp monitor, ethernet adapter.
19	Compaq Deskpro 6000T 800/345-1518 www.compaq.com	19	May 98	$3848	Pentium II-300	$152 price drop on expensive corporate PC; tested with Windows NT.
20	CLR PT2-DA300 800/611-1555 www.clrusa.com	n/a	May 98	$2699	Pentium II-300	Average performer for a PII-300; comes with large hard drive.

Best Buy See features chart, page 232; test report, page 234.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100."
[2] For more information about all products in this table, circle reader service no. 909.

YOU GET A LOT MORE FOR YOUR POWER DOLLAR this month: Systems based on Pentium II-333 and PII-300 chips abound. In fact, Dell's OptiPlex GXa 266 is the only ranked machine with a CPU slower than 300 MHz. Our number one finisher, Gateway's new G6-333, racked up the highest PC WorldBench 98 performance score ever for a Windows 95 system, testing 8 percent faster than Dell's comparable Dimension XPS D333 while costing $115 less. We also reviewed the PC 3500 6300, a Pentium II-300 model from Digital. Though well designed and a reasonably good performer, it costs a bit too much to earn a spot on this month's chart. Read about it at www.pcworld.com/t20pcs.

SCORECARD

★ Overall rating	PC WorldBench/ operating system	Performance [1]	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	Reader service number [2]
88	179/Win 95	outstanding	very good	average	inexpensive	above average/best	759
87	164/Win 95	very good	very good	above average	average	above average/best	760
85	172/Win 95	very good	good	average	inexpensive	above average/best	761
84	151/Win 95	good	outstanding	average	inexpensive	average/best	762
82	169/Win 95	very good	very good	below average	inexpensive	average/good	763
82	158/Win 95	good	very good	[3]	very inexpensive	[3]/best	764
81	175/Win 95	outstanding	very good	below average	average	average/good	765
80	144/Win 95	good	good	above average	inexpensive	above average/best	766
80	136/Win 95	satisfactory	outstanding	average	inexpensive	average/best	767
79	218/Win NT 4.0	very good	very good	average	average	average/poor	768
79	168/Win 95	very good	very good	[3]	inexpensive	[3]/poor	769
79	213/Win NT 4.0	very good	very good	[3]	inexpensive	[3]/good	770
78	220/Win NT 4.0	outstanding	very good	[3]	expensive	[3]/good	771
78	173/Win 95	very good	good	[3]	inexpensive	[3]/fair	772
78	198/Win NT 4.0	good	good	average	very inexpensive	average/best	773
77	162/Win 95	good	very good	average	average	average/fair	774
76	170/Win 95	very good	good	[3]	average	[3]/good	775
76	205/Win NT 4.0	good	good	[3]	inexpensive	[3]/best	776
75	202/Win NT 4.0	good	very good	average	very expensive	average/best	777
75	157/Win 95	good	good	[3]	inexpensive	[3]/good	778
Scorecard weightings ▶		Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

[1] Insufficient data to give a rating.

This Month's Best Buys

1 GATEWAY G6-333

PRO: Fastest Windows 95 PC we've tested

CON: Midtower case's curved top makes stacking external components difficult

The new Gateway G6-333 is a winner—a terrifically speedy Pentium II-333 machine with all the horsepower you need to run apps at your home office or small office. This well-designed, generously configured PC earns our top Best Buy right out of the gate. And with a PC WorldBench 98 score of 179, the G6-333 ranks as the fastest Windows 95 machine we've tested. Best of all, the G6-333 has a modest price: $2684 is eminently reasonable for a system that comes packed with high-end features.

For your greenbacks, you get a 2X DVD-ROM drive and a sampler of DVD movie previews. Other features are equally impressive, if a bit less fun. The STB Velocity 128 Accelerated Graphics Port video card offers resolutions up to 1600 by 1200 dots per inch, though you would not want to push the 17-inch Gateway EV700 monitor that far.

Gateway G6-333

Enjoy listening to your favorite music while you work? The Ensoniq Audio PCI sound card feeds audio to good, basic Altec Lansing ACS41 speakers, which produce fine sound quality despite lacking a subwoofer to boost the bass. We liked the multifunction keyboard that accompanies the G6-333: Extra buttons on it let you adjust sound level and control audio CDs—and even a TV or radio if you hook up the system to a home entertainment center. And of course, you get components that we've come to expect in souped-up Best Buys: a 56-kilobits-per-second x2 modem and a hefty 8.4GB hard drive.

Like other Gateway G6 machines, this PII-333 midtower has a dove-gray case with curved sides and a rounded top. It's nice to look at and fairly well designed—as long as you don't try to stack components on the tipsy top. Removing the side of the case isn't too difficult—just turn two large screws—and the front pops off to provide access to the three empty external drive bays. Inside, you'll find minimal cable clutter: We were easily able to reach and fill the two available expansion slots and the one empty DIMM socket. Finishing the job was the toughest part; we struggled a bit to line up the side of the cover with the case before we could fit it back in place.

If you have any problems upgrading your machine—or even setting it up—the documentation provides detailed information and drawings to help you out. If that doesn't work, you can always turn to Gateway's round-the-clock toll-free technical support. We didn't have to wait long on hold when we called anonymously, and the technicians offered good advice. ▶

PHOTOGRAPHS KEN SMITH

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Modem speed (kbps)
1	Gateway G6-333*	Pentium II-333	Windows 95	64	512	8.4	STB Velocity 128 AGP (OEM)	4/SGRAM	17/16.1	56 [2]
2	Dell Dimension XPS D333*	Pentium II-333	Windows 95	64	512	8	STB Velocity 128 (AGP)	4/SGRAM	17/15.9	56 [2]
3	Gateway E-3110 300*	Pentium II-300	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	8/SGRAM	19/18	not included
4	Quantex QP6/300 SM-4x*	Pentium II-300	Windows 95	64	512	6.4	Number Nine Revolution 3D	8/WRAM	19/17.9	56 [3]
5	NEC Direction SPL 333*	Pentium II-333	Windows 95	64	512	6.4	Diamond Viper V330 AGP	4/SGRAM	17/16	56 [2]
6	Unicent Avanta L333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	4/SGRAM	17/15.9	56 [2]
7	NEC PowerMate Enterprise 8000	Pentium II-333	Windows 95	64	512	6.4	ATI Xpert@Work (AGP)	8/SGRAM	17/16	not included
8	Dell OptiPlex GXa 266	Pentium II-266	Windows 95	32	512	3.2	integrated ATI 3D Rage Pro	4/SGRAM	17/15.9	not included
9	Quantex QP6/300 SM-4xSE	Pentium II-300	Windows 95	32	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	19/17.9	56 [3]
10	HP Vectra VL Series 7	Pentium II-333	Windows NT 4.0	64	512	6.4	Matrox Millennium II	8/WRAM	17/15.9	not included
11	Premio Shadowhawk LX PII 333	Pentium II-333	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	8/SGRAM	17/15.7	56 [2]
12	Sys Technology Sys Performance Pro 300LA	Pentium II-300	Windows NT 4.0	64	512	6.4	Matrox Millennium II (AGP)	8/WRAM	17/15.7	56 [2]
13	Sys Technology Sys Performance Pro 333H2	Pentium II-333	Windows NT 4.0	64	512	8.4	Matrox Millennium II (AGP)	8/WRAM	17/15.9	56 [2]
14	NexTrend NexStar-600W	Pentium II-333	Windows 95	64	512	6.4	Matrox Millennium II (AGP)	4/WRAM	17/16	56 [2]
15	Quantex QP6/300 SB-4x	Pentium II-300	Windows NT 4.0	64	512	6.4	Diamond Viper 330 (AGP)	4/SGRAM	19/17.9	56 [3]
16	HP Brio PC 8379	Pentium II-300	Windows 95	64	512	8	Matrox Millennium II (AGP)	4/WRAM	17/15.8	56 [2]
17	CompUSA American Pro Ap333L-SE	Pentium II-333	Windows 95	64	512	8.4	STB Velocity 128 (AGP)	4/SGRAM	17/15.9	56 [3]
18	Everex StepStation 2 P2-300	Pentium II-300	Windows NT 4.0	64	512	8.4	FIC 3Dlabs (AGP)	8/SGRAM	17/16.1	not included
19	Compaq Deskpro 6000T	Pentium II-300	Windows NT 4.0	64	512	4.3	Matrox Millennium II (AGP)	4/WRAM	19/18	not included
20	CLR PT2-DA300	Pentium II-300	Windows 95	64	512	8.4	ATI Xpert@Play (AGP)	8/SGRAM	17/15.9	56 [2]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.
[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

2 DELL DIMENSION XPS D333

PRO: Includes 2X DVD-ROM player and Iomega Zip drive, strong support policies

CON: Case can be difficult to open

The $2799 Dell Dimension XPS D333 is a fast, loaded midtower PC that reigned as our number one power desktop last month. It's still an excellent value, but even a $130 drop in price can't help the XPS D333 outscore Gateway's impressive new G6-333. The Gateway still costs $130 less ($2684) and performed 9 percent faster than the Dell in our PC WorldBench 98 tests—with a score of 179, versus the Dell's 164.

So why might you still consider the XPS D333? Dell's top-notch support is one reason, and the system's somewhat higher-quality 17-inch monitor is another. Other components are equal: Both models come with a 2X DVD-ROM drive, for example. (Among other ranked PCs, only the 10th-place HP Vectra VL Series 7 and number 17 CompUSA American Pro Ap333L-SE have DVD.) The second-generation DVD drives installed in these PCs are compatible with all CD formats, including CD-R, and provide fairly good performance with CD-ROM apps. And of course, they let you play DVD movies and use DVD-ROM games, general-reference software, and single-disc national phone directories. Unfortunately, the currently available assortment of DVD-ROM apps for general business is rather scanty.

Dell Dimension XPS D333

Dell also includes more-standard power fare, such as a generous 64MB helping of RAM, a copious 8GB hard drive, and a 4MB STB Velocity 128 3D graphics card. The full-duplex Sound Blaster AWE64 audio card teams with Altec Lansing ACS290 speakers and subwoofer to deliver good high- and midlevel tones, though bass notes seemed a bit muddy to our ears. The XPS D333 also sports a useful software bundle, including Microsoft Office 97 Small Business Edition v2 and either Bookshelf or Encarta.

The D333 is well marked for easy setup—the back ports have color coding and identification symbols. But as with most Dimension XPS systems, the case is a challenge to open: Tabs that you

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD-ROM	Ensoniq Audio PCI	midtower	384	1	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	384	1	3/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Ensoniq Audio PCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	integrated Yamaha YMF715	midtower	384	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Ensoniq Audio PCI	midtower	384	2	3/1	4	5/3	24	Sat., Sun.	BBS, WWW
12X-24X	integrated Yamaha OPL3-Sax	midtower	384	2	2/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	integrated Crystal PnP	midtower	384	2	2/1	7	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	Ensoniq Audio PCI	midtower	512	3	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Aztech AZT2320	midtower	384	2	2/1	4	3/3	11 [4]	none	AOL, BBS, CIS, WWW
12X-24X	Sound Blaster AWE64	midtower	512	2	3/2	3	3/3	9	none	BBS, WWW
12X-24X	Sound Blaster AWE64	midtower	1024	2	3/2	4	varies [5]/5	24	Sat., Sun.	WWW
14X-32X	integrated Yamaha OPL3-Sax	midtower	384	1	3/1	3	varies [5]/5	24	Sat., Sun.	WWW
12X-24X	Sound Blaster AWE64	midtower	384	1	2/1	4	varies [6]/3	24	Sat., Sun.	BBS
14X-32X	none	midtower	512	2	3/3	5	3/1	24	Sat., Sun.	BBS, WWW
14X-32X	HP Audio Device (AZT 1008)	midtower	192	2	2/1	3	3/3	16 [4]	Sat.	AOL, CIS, WWW
2X DVD-ROM	integrated	minitower	384	2	2/0	3	3/1	24	Sat., Sun.	WWW
14X-32X	ESS Sound Conductor 16 PnP	midtower	384	2	3/1	4	3/3	24	Sat., Sun.	BBS, WWW
12X-24X	ESS ES1B69 Audio Drive	midtower	384	1	2/0	6	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-24X	integrated	midtower	384	1	2/0	4	3/3	12	none	WWW

[3] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Not toll-free.
[5] Six years on CPU and main RAM, one to five years on other parts.
[6] One year on CPU, main RAM, monitor, keyboard, mouse, and speakers; three years on other parts.

must simultaneously press and pull to get inside the machine are hard to grip, making it tough to work the panel free. Inside, you'll find little room for expansion cards—the modem and the sound card occupy the two ISA slots, leaving only two PCI slots available. Fortunately, the three available external bays offer a reasonable amount of room to accommodate removable-media devices such as Zip, CD-R, and tape backup drives.

Dell's documentation includes a foldout setup guide that will help you get up and running quickly. The company's support policies are strong, though not quite as good as Gateway's: Parts are covered for three years, labor is covered for one, and toll-free phone support is available 24 hours a day, seven days a week.

3 GATEWAY E-3110 300

PRO: Easy-off external case, bundled LAN adapter and client management software, big monitor, top-tier support policies

CON: Curved case top makes stacking external components difficult

Great performance, good components, and a $163 price reduction help secure the Gateway E-3110 300's place in the Best Buy ranks for a second straight month. Powered by a Pentium II-300 processor, this corporate midtower cranked out a PC WorldBench 98 score of 172—very peppy for its CPU class, and the second-highest among our Best Buys. In addition, the E-3110 comes with perks such as an SMC EtherPower II 10/100 network interface card to support easy high-speed network connection, plus DMI-2 client management software that lets LAN administrators track changes and upgrade the system remotely.

Gateway E-3110 300

At $2585, the E-3110 300 comes well configured, from its 8.4GB hard drive to the roomy 19-inch Gateway EV900 monitor. Gateway also sweetens the box with tidbits that many corporate systems lack, such as an Ensoniq AudioPCI sound card and reasonably good-sounding Altec Lansing ACS41 speakers. Like most other PCs sold specifically for hookup to a LAN, the E-3110 does not come with a modem.

Color-coded cables and ports make attaching ▶

peripherals easy. The cover is a breeze to remove too: Just twist off the two large screws with your fingers, and you can slide back the side panel to reveal the orderly interior. Gateway's support policies are terrific, including a three-year parts and labor warranty and toll-free technical support around the clock.

4 QUANTEX QP6/300 SM-4X

PRO: Attractive price, good-quality components

CON: Blurry monitor

If you want your PC to move so fast that you feel the wind in your face, skip the $2449 Quantex QP6/300 SM-4x: Its PC WorldBench 98 score of 151 puts it ahead of only one other power system on our Top 20—its tortoise-like sibling, the SM-4xSE. Still, if you're upgrading from a Pentium-75, you'll be plenty impressed with the SM-4x's speed. It also features an attractive multimedia configuration, and its great bundle of home and office software helps it capture a Best Buy ranking for a second month.

The QP6/300 SM-4x comes with a number of notable components: Home-office users will appreciate the Ensoniq AudioPCI sound board, which provides excellent playback under Windows 95, although it won't work with DOS-only games. The 14X–32X CD-ROM drive spins discs as fast as they can turn. The 8MB Number Nine Revolution 3D video adapter does a competent job of porting graphic images to the big 19-inch ▶

TOP 20 POWER DESKTOPS

TEST REPORT

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC World-Bench score
1	Gateway G6-333*	Pentium II-333	Win 95	64	512	179
2	Dell Dimension XPS D333*	Pentium II-333	Win 95	64	512	164
3	Gateway E-3110 300*	Pentium II-300	Win 95	64	512	172
4	Quantex QP6/300 SM-4x*	Pentium II-300	Win 95	64	512	151
5	NEC Direction SPL 333*	Pentium II-333	Win 95	64	512	169
6	Unicent Avanta L333	Pentium II-333	Win 95	64	512	158
7	NEC PowerMate Enterprise 8000	Pentium II-333	Win 95	64	512	175
8	Dell OptiPlex GXa 266	Pentium II-266	Win 95	32	512	144
9	Quantex QP6/300 SM-4xSE	Pentium II-300	Win 95	32	512	136
10	HP Vectra VL Series 7	Pentium II-333	Win NT 4.0	64	512	218
11	Premio Shadowhawk LX PII 333	Pentium II-333	Win 95	64	512	168
12	Sys Technology Sys Performance Pro 300LA	Pentium II-300	Win NT 4.0	64	512	213
13	Sys Technology Sys Performance Pro 333H2	Pentium II-333	Win NT 4.0	64	512	220
14	NexTrend NexStar-600W	Pentium II-333	Win 95	64	512	173
15	Quantex QP6/300 SB-4x	Pentium II-300	Win NT 4.0	64	512	198
16	HP Brio PC 8379	Pentium II-300	Win 95	64	512	162
17	CompUSA American Pro Ap333L-SE	Pentium II-333	Win 95	64	512	170
18	Everex StepStation 2 P2-300	Pentium II-300	Win NT 4.0	64	512	205
19	Compaq Deskpro 6000T	Pentium II-300	Win NT 4.0	64	512	202
20	CLR PT2-DA300	Pentium II-300	Win 95	64	512	157

*Best Buy

Word 97 · Word Pro 97 · Excel 97 · 1-2-3 97 · Paradox B.0 · Picture Publisher 7.0

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World's* application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 9B score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 95.

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monitor—but the blurriness of the MAG DJ900 display disappointed us.

Though the reliability of Quantex machines is only average, the company's support policies get our best ratings: Quantex offers a three-year parts warranty, one year of free labor, and round-the-clock toll-free support. We noted an improvement in Quantex's support responsiveness this month when making our anonymous calls—the company managed to cut the 45-minute waits we experienced last month approximately in half—but it still could be better.

Quantex QP6/300 SM-4x

5 NEC DIRECTION SPL 333

PRO: Well designed and built, good price for a PII-333, nice graphics card and monitor combo

CON: 24X CD-ROM drive doesn't match 32X or DVD drive offerings of other power Best Buys

NEC's Direction line has impressed us since its launch last year, delivering strong performance, user-friendly design, and low prices to corporate and home buyers alike. The Direction SPL 333 is a competitive $2487 system built around one of Intel's fastest CPUs. This rugged midtower isn't the quickest machine on our chart—its PC WorldBench score of 169 is about average for a Pentium II-333—but it's still very fast and includes a slew of high-quality multimedia components.

With 64MB of SDRAM and a 6.4GB hard disk, the Direction SPL 333's configuration matches that of other top-ranked power desktops. The Diamond Viper V330 AGP graphics card is an admirable performer and a good match for the 17-inch NEC C700, a monitor with extensive controls that delivers a crisp picture. NEC also includes in its software bundle a copy of Microsoft Office 97 Small Business Edition v2—one of the best and most popular business application suites available.

NEC Direction SPL 333

The inexpensive 12X–24X CD-ROM drive helps the SPL 333 achieve its low price, though power systems now come with drives capable of reading data at 32X speeds. The integrated Yamaha sound chip provides good basic 16-bit business audio but doesn't match the quality of other power desktops' Ensoniq AudioPCI or Sound Blaster AWE64 cards.

The SPL 333 boasts the same careful attention to detail found in other Direction PCs, including color-coded rear ports and an easy-open case. NEC backs its Direction line with an excellent three-year warranty on parts and labor. Though the company received below-average marks for system reliability and service in our last survey, we've had little trouble getting through to tech support recently, and we received fairly accurate advice.

New This Month

The following PCs made our power desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

6 UNICENT AVANTA L333

PRO: One of the cheapest Pentium II-333 we've seen, generously expandable

CONS: Slow performance for its processor class, mediocre keyboard, inadequate system manual

If you work in a small office or home office running on a tight budget, the Unicent Avanta L333 has your name on it. At $2399, the Avanta is one of the cheapest Pentium II-333 machines we've seen. But don't expect top speed in the bargain: It's also the slowest PII-333 with Windows 95 we've ever tested. Overall, though, you get a good configuration and excellent support policies for the price.

The Avanta carries a lot of high-quality components. It includes an 8.4GB hard drive, which will take a while to fill up even though it comes loaded with the space-slurping applications of Microsoft Office 97 Small Business Edition. We appreciated this machine's multimedia features too: The Ensoniq AudioPCI card pipes rich sound to the Altec Lansing ACS90 speakers, and a 14X–32X CD-ROM drive spins your discs as fast as they can go today. The ATI Xpert@Work graphics card (one of the best AGP boards we've tested) ports images to a decent 17-inch monitor. We liked the included Microsoft IntelliMouse but were disappointed with the Mitsumi keyboard. It made too much noise when we typed, and it felt flimsy.

Getting inside the Avanta is easy—a crucial advantage if you're in an office without full-time IS support: You just pop off the front panel of the case for access to the processor, DIMM sockets, and slots. We liked the expansion possibilities of this midtower: Four free slots and four open drive bays give you plenty of room to add an ethernet card, a DVD-ROM controller, a video capture board, or other enhancements. If you decide to add an extra hard drive or tape backup unit, the process couldn't be simpler: All of the main drive bays are mounted together in one module that slips out when you remove a single screw.

Unicent Avanta L333

Unicent offers top-notch support policies, including round-the-clock technical support. Unfortunately, you might need the help because the Avanta L333 lacks an overall system manual; it includes only a Windows 95 manual and documentation for the MicroStar motherboard. In our latest round of support calls, Unicent's responsiveness and accuracy were adequate, though we sat on hold for about 15 minutes. Also, the company's technicians could have been quicker at figuring out our problem.

11 PREMIO SHADOWHAWK LX PII 333

PRO: Good performer, high-quality components, ethernet adapter

CON: Technical support could be better

With a $2631 price and a PC WorldBench 98 score of 168, the Premio Shadowhawk LX PII 333 lands right smack in the middle of its Pentium II-333 processor class. But this is no average, humdrum machine: It's got the right stuff to make the typical high-end corporate user happy, including 64MB of SDRAM, a top- ▶

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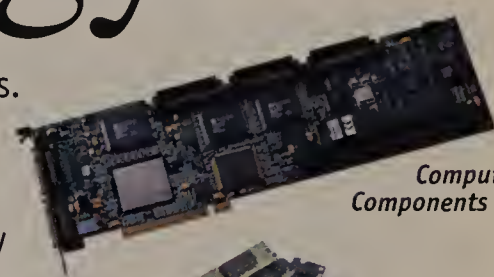

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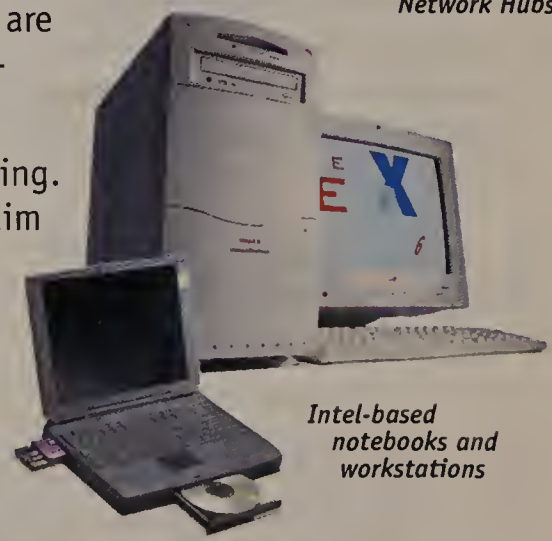

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notch ATI Xpert@Work AGP graphics card, a good-size 8.4GB Maxtor hard disk, and a fast ethernet adapter. The Shadowhawk also comes with a fine software bundle. It includes a sampler CD-ROM of Microsoft's Developer Network (a helpful technical support library for people who want to develop database applications for their office), as well as Microsoft Office 97 Professional Edition.

Shadowhawk LX PII 333

The Shadowhawk has good sound, thanks to the full-duplex Sound Blaster AWE64 wavetable audio card and two-way MLi 270T speakers. The latter carry the highs, middle tones, and low notes well without the help of a subwoofer.

The Shadowhawk's roomy case is fairly easy to get into, but you need a screwdriver. Adding memory or a peripheral such as a removable Zip or tape backup drive should be no sweat, but you'd better have an IS department to rely on if problems arise. When we called Premio anonymously for help, the quality of its service ran hot and cold: Sometimes we waited on hold for half an hour; other times a technician answered right away. Sometimes the answer was helpful; other times the rep rushed us off the phone.

13 SYS TECHNOLOGY SYS PERFORMANCE PRO 333H2

PRO: Fastest system on the chart

CON: Expensive, no business software bundle

If you're looking for fever-pitch performance, Sys Technology's Sys Performance Pro 333H2 fits the bill: Loaded with Windows NT, this machine earned a PC WorldBench 98 score of 220—our highest ever. Of course, if you want a great price too, you'll have to look elsewhere. These days, paying $3257 could send you into sticker shock. (Among ranked systems, only the $3848 Compaq Deskpro 6000T, in spot 19, costs more.)

Performance Pro 333H2

For the price, you'd expect top-of-the-line multimedia hardware across the board, but the Performance Pro 333H2's features are rather uneven. Among the better components are a 14X–32X CD-ROM drive and a crisp 17-inch Sys SPM-17MS monitor. But the integrated Yamaha sound chip set lacks a hardware wavetable for the most accurate audio processing. The Performance Pro 333H2 also features a special hard drive setup that's rarely seen in desktop PCs: It uses a pair of 4.2GB hard drives connected to a Promise FastTrak RAID (redundant array of inexpensive disks) controller. The system we reviewed came with data "striped" across both drives, allowing access to the full 8.4GB capacity and providing faster-than-usual access to data. Alternatively, you can mirror data to both drives, ensuring a redundant copy of all your data but decreasing your total capacity to 4.2GB.

Sys Technology offers its customers some of the longest warranties in the industry. You get six years of protection for the CPU and RAM, one to five years on other parts, and five years of labor. Phone technical support is available around the clock, but don't expect immediate service: We often had to leave several messages before reaching a rep.

17 COMPUSA AMERICAN PRO AP333L-SE

PRO: High-quality components, including a DVD-ROM drive and excellent speakers

CON: Expensive, hard to upgrade, poor manuals

You want it all? At first glance, CompUSA's American Pro Ap333L-SE seems to have everything, from a Pentium II-333 processor to a 2X DVD-ROM drive to Microsoft Office 97 Small Business Edition v2. So why didn't this minitower place higher on our chart? Because $2999 is a lot to pay for the configuration and tech support you get.

In many ways, the American Pro is impressive: Its PC WorldBench 98 score of 170 is very high for a Windows 95 machine, even though it puts the AP333L-SE in only the middle of the pack among Pentium II-333 systems. And the PC's configuration—a K56flex modem, an 8.4GB hard drive, and an STB Velocity 128 AGP graphics card with 4MB of SGRAM—will make you whistle in appreciation. We also loved the Altec Lansing ACS45 speakers and subwoofer combination accompanying this machine: It made Tchaikovsky sound full and rich—no tinny flutes or violins—and we could practically feel the timpani.

We weren't impressed by the monitor and keyboard, though. The 17-inch CompUSA PC CPC-7861 display does have easy-to-use button controls; however, small print looks a little fuzzy on the screen at 1024-by-768-dpi resolution, and colors lack the richness we've seen on really good monitors. The keyboard is nicely designed—a ridge at the top holds pens and pencils—but the key action is far too stiff for comfortable typing.

American Pro Ap333L-SE

The case of the American Pro is so short and squat it's almost cute. But the machine's interior is less charming. The power supply box blocks half the motherboard and severely restricts access to the drive bays. To get to the two empty RAM sockets, you have to slide your hand past the power supply and thread your way through a tight snarl of cables—a task that practically requires acrobatics.

We were equally dismayed by the documentation that comes with this system; the user manual is especially uninformative. Though the company offers round-the-clock toll-free phone support, our anonymous calls connected us to technical reps who were rather curt and unable to answer some of our standard questions. If you can live without top support, don't demand an easily upgradable machine, and have the extra dollars, the American Pro is a pretty good PC. But even then, you might be better off waiting until the price drops a little before you make your purchase. ▶

Beyond the Top 20: Online

We evaluated this system along with the others, but it didn't score high enough to reach the Top 20 Power Desktops chart. For the write-up, see PC World Online (www.pcworld.com/t20pcs).

◆ **Digital PC 3500 6300**

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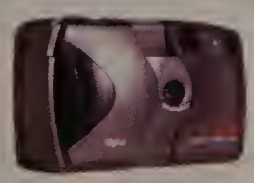

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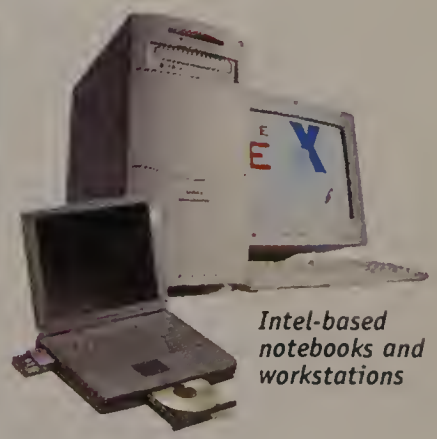

Intel-based notebooks and workstations

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (3/11/98)	CPU	Comments
1	Gateway G6-266b 800/846-2000 www.gateway.com	1	May 98	$1879	Pentium II-266	$60 price drop on fast home-office machine; top-notch support policies.
2	Gateway E-3110 233 800/779-2000 www.gateway.com	n/a	May 98	$1715	Pentium II-233	Whopping $272 price cut on corporate machine; PII-266 also good value.
3	Dell Dimension XPS D266 800/388-8542 www.dell.com	3	May 98	$2199	Pentium II-266	Well supported PII-266 includes AGP graphics and Office 97.
4	CyberMax PowerMax 7 800/437-4596 www.cybermaxpc.com	n/a	May 98	$2199	Pentium II-300	$64 price drop moves PII-300 machine from power to budget chart.
5	Micro Express MicroFlex-B2450 800/989-9900 www.microexpress.net	n/a	NEW	$1499	AMD K6-233	Well-configured with fine sound; faster than most AMD K6-233 and PMMX-233 PCs.
6	Micro Express MicroFlex-F300B 800/989-9900 www.microexpress.net	n/a	May 98	$1899	Pentium II-300	$400 price cut moves PII-300 to budget chart; 2X DVD-ROM drive but slow modem.
7	Tagram Thunderbolt H2630 Pentium II 333 800/824-7267 www.tagram.com	n/a	NEW	$2199	Pentium II-333	Fastest Windows 95 PC on chart; plenty of storage but lower-end software.
8	Quantex QP6/233 SB-3x 800/896-4898 www.quantex.com	n/a	May 98	$1799	Pentium II-233	$150 price cut on NT 4.0 machine with no sound card.
9	Micron Millennia Mme 888/634-8799 www.micronpc.com	7	May 98	$1794	Pentium MMX-200	Multimedia machine gets $161 cut; terrific sound card and speakers.
10	Quantex QP6/266 SB-3x 800/896-4898 www.quantex.com	4	May 98	$1999	Pentium II-266	Corporate machine with good support policies, tested with NT 4.0; lacks sound card.
11	Kingdom Pinnacle 300/P2 800/385-3436 www.kingdomcomputers.com	n/a	May 98	$2197	Pentium II-300	$397 plunge moves generic home-office PC to budget chart.
12	Polywell Poly K6266MX 800/999-1278 www.polywell.com	6	May 98	$1895	AMD K6-266	Price down $55 on expandable AMD K6; support is unresponsive, lasts two months.
13	Polywell Poly 700L5 PII 300 800/999-1278 www.polywell.com	n/a	May 98	$2150	Pentium II-300	$200 cut on expandable former power desktop; AGP capable but has PCI graphics.
14	ProGen Polaris PII-266 888/776-9595 www.progen.com	n/a	NEW	$1799	Pentium II-266	Basic home-office PC comes with good office software; cluttered interior.
15	MidWest Micro Office Pro-300 800/728-8582 www.mwmicro.com	n/a	NEW	$1999	Pentium II-300	Quick machine includes small-business package; support could be better.
16	Everex AGI MMX 233 800/821-0806 www.everex.com	8	May 98	$1180	Pentium MMX-233	Still the cheapest PC on the chart; good support policies.
17	Micro X MPD-8000 PII 266 800/736-4276 www.microx.com	n/a	NEW	$1499	Pentium II-266	Inexpensive PII-266 has DVD-ROM drive, but monitor is small.
18	Unicent Avanta L233 800/308-3614 www.unicent.com	10	May 98	$1749	Pentium II-233	Price drop of $50 on well-configured machine; top-tier support policies.
19	Micron ClientPro MRE 888/634-8799 www.micronpc.com	19	May 98	$1658	Pentium MMX-233	$100 price drop on network-ready midtower with good support; tested with NT 4.0.
20	Kingdom Pinnacle M200+ V 800/385-3436 www.kingdomcomputers.com	13	May 98	$1197	Cx6x86MX-PR200	Very inexpensive system; weak support policies.

Best Buy See features chart, page 242; test report, page 244.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100."
[2] For more information about all products in this table, circle reader service no. 910.

FEISTY SMALLER VENDORS ARE PUSHING THEIR WAY toward the top of the budget chart. Tagram, absent from our reviews for a couple of years, earns seventh place with its impressive Thunderbolt H2630—the first budget Pentium II-333 we've tested. Its $2199 price is high, but its PC WorldBench 98 score of 171 would look comfortable on our power chart. Micro Express claims a Best Buy after a $400 price cut redefined its PII-300 MicroFlex-F300B (in ninth place on last month's power chart) as a budget desktop. Of course, not all of the smaller vendors earned chart positions: Among our also-rans this month are models from Digital, DTK, Kingdom, Monorail, and Racer.

SCORECARD

★ Overall rating	PC WorldBench/ operating system	Features and design	Price	Performance [1]	Vendor's system reliability	Vendor's support quality/policies	Reader service number [2]
83	144/Win 95	very good	average	good	average	above average/best	779
80	135/Win 95	good	average	good	average	above average/best	780
79	142/Win 95	good	expensive	good	above average	above average/best	781
79	152/Win 95	very good	expensive	very good	[3]	[3]/best	782
78	140/Win 95	good	inexpensive	good	[3]	[3]/best	783
78	161/Win 95	good	average	very good	[3]	[3]/best	784
78	171/Win 95	very good	expensive	outstanding	[3]	[3]/fair	785
77	170/Win NT 4.0	good	average	good	average	average/best	786
77	115/Win 95	good	average	satisfactory	above average	above average/best	787
77	189/Win NT 4.0	satisfactory	average	outstanding	average	average/best	788
76	164/Win 95	very good	expensive	very good	[3]	[3]/fair	789
76	145/Win 95	very good	average	good	[3]	[3]/good	790
75	159/Win 95	very good	expensive	very good	[3]	[3]/good	791
75	147/Win 95	very good	average	good	[3]	[3]/fair	792
74	161/Win 95	good	average	very good	[3]	[3]/fair	793
74	119/Win 95	good	inexpensive	satisfactory	[3]	[3]/good	794
74	145/Win 95	good	inexpensive	good	[3]	[3]/good	795
74	135/Win 95	good	average	good	[3]	[3]/best	796
73	143/Win NT 4.0	satisfactory	average	satisfactory	above average	above average/best	797
73	122/Win 95	good	inexpensive	satisfactory	[3]	[3]/fair	798
Scorecard weightings ▶		Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

[3] Insufficient data to give a rating.

This Month's Best Buys

1 GATEWAY G6-266B

PRO: High-quality components, top support

CON: Curved top of midtower case makes it hard to stack peripherals

The Gateway G6-266b tops our budget Best Buys again this month. At $1879, the G6-266b is a good PC for business use, with top-tier components and solid performance.

This Pentium II-266 midtower is outfitted fairly well. It comes with a 56-kbps modem, and its STB Velocity 128 3D video card is a decent AGP board. The included Ensoniq Audio PCI wavetable card and Boston Acoustic satellite speakers with subwoofer provide good-quality sound.

Nifty design touches enhance this PC. The sides and top of the light-gray case curve subtly outward. This is a nice contrast to the typical desktop cityscape of square, putty-colored boxes, but the arched top means you can't place disks or external peripherals there. We found the case simple to open, thanks to the side-panel grip at the back. Inside, Gateway leaves lots of room for expansion, with a neat interior and plenty of available slots, memory sockets, and drive bays.

Gateway G6-266b

Gateway's documentation is laudable. The well-organized manual offers concise, informative help and useful color illustrations. The company's support policies include a three-year warranty on parts and labor and 24-hour toll-free tech support.

2 GATEWAY E-3110 233

PRO: Easy-open case, good price

CON: Midtower case's curved top makes stacking external components difficult

A $262 price cut puts Gateway's E-3110 233 on the chart for the first time. It competes well against corporate PCs from other major vendors. And its PC WorldBench 98 score of 135 isn't bad for a budget system—especially one that costs only $1715.

The E-3110's easy-off cover hides a clean and accessible interior. The 32MB of SDRAM is typical of many budget PCs, but the 4GB hard drive is about 1GB smaller than average. The 17-inch EV700 monitor bundled with the system should be fine for typical business use, but if you do high-end graphics tasks—or even work with small fonts in spreadsheets—your eyes will thank you for spending the extra $110 to obtain the better-quality Vivitron 700 17-inch monitor.

Gateway E-3110 233

As usual, Gateway's documentation is good, and the company's support policies are top-notch: You get a three-year warranty on parts and labor, along with toll-free support any time you need it. ▶

PHOTOGRAPHS: KEN SMITH

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Modem speed (kbps)
1	Gateway G6-266b*	Pentium II-266	Windows 95	32	512	4.6	STB Velocity 128 (AGP, OEM)	4/SGRAM	17/16	56 [2]
2	Gateway E-3110 233*	Pentium II-233	Windows 95	32	512	4	ATI Xpert@Work	8/SGRAM	17/15.9	56 [2]
3	Dell Dimension XPS D266*	Pentium II-266	Windows 95	32	512	4	STB Velocity 128 (AGP)	4/SGRAM	17/15.8	56 [2]
4	CyberMax PowerMax 7*	Pentium II-300	Windows 95	64	512	8.4	STB Velocity 128 (AGP)	4/SGRAM	17/16.1	56 [3]
5	Micro Express MicroFlex-B2450*	AMD K6-233	Windows 95	64	1024	4.3	ATI Xpert@Work	4/SGRAM	17/15.8	56 [3]
6	Micro Express MicroFlex-F300B	Pentium II-300	Windows 95	64	512	4	ATI Xpert@Work (AGP)	8/SGRAM	17/15.8	33.6
7	Tagram Thunderbolt H2630 PII 333	Pentium II-333	Windows 95	64	512	6.4	ATI Xpert@Work (AGP)	8/SGRAM	17/16.1	56 [3]
8	Quantex QP6/233 SB-3x	Pentium II-233	Windows NT 4.0	64	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	17/16.1	56 [3]
9	Micron Millennia Mme	Pentium MMX-200	Windows 95	32	512	3.2	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/16	56 [2]
10	Quantex QP6/266 SB-3x	Pentium II-266	Windows NT 4.0	64	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	17/16.1	56 [3]
11	Kingdom Pinnacle 300/P2	Pentium II-300	Windows 95	64	512	6.4	ATI 3D Xpert@Work	4/SGRAM	17/15.7	56 [2]
12	Polywell Poly K6266MX	AMD K6-266	Windows 95	64	512	7	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/15.8	56 [3]
13	Polywell Poly 700L5 PII 300	Pentium II-300	Windows 95	64	512	7	Diamond Fire GL 1000 Pro	8/SGRAM	17/15.7	56 [3]
14	ProGen Polaris PII-266	Pentium II-266	Windows 95	32	512	8.4	Number Nine Revolution 3D (AGP)	8/WRAM	17/16	56 [2]
15	MidWest Micro Office Pro-300	Pentium II-300	Windows 95	32	512	6.4	ATI Xpert@Work (AGP)	4/SGRAM	17/16.1	not included
16	Everex AGI MMX 233	Pentium MMX-233	Windows 95	32	1024	3.2	Diamond Stealth 3D 2000 Pro	2/EDO DRAM	15/13.6	56 [3]
17	Micro X MPD-8000 PII 266	Pentium II-266	Windows 95	32	512	3.2	Matrox Productiva G-100 (AGP)	4/SGRAM	15/13.6	56 [3]
18	Unicent Avanta L233	Pentium II-233	Windows 95	32	512	4.3	Matrox Mystique	4/SGRAM	17/15.5	56 [2]
19	Micron ClientPro MRE	Pentium MMX-233	Windows NT 4.0	32	512	3.2	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	15/13.7	not included
20	Kingdom Pinnacle M200+ V	Cx6xB6MX-PR200	Windows 95	32	512	3.5	Hercules Terminator 3D/DX	4/EDO DRAM	15/13.9	56 [2]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.
[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

3 DELL DIMENSION XPS D266

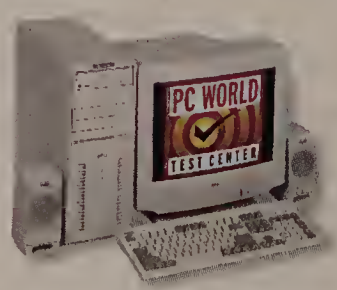
PRO: Well built; high-quality AGP graphics card

CON: Speakers are slightly bass-heavy

For the most part, this high-end small-office and home-office PC is top-drawer. The $2199 Dimension XPS D266's only run-of-the-mill components are its 32MB of SDRAM and the slightly below-average 4GB hard drive. The first-rate features include a 14X–32X CD-ROM drive, a 56-kbps 3Com/U.S. Robotics Sportster x2 modem, and a Sound Blaster AWE64 sound board.

Dell's economy-model 17-inch 1000LS monitor improves substantially on the previous LS-1000 model—though its controls are a bit confusing.

Despite the wealth of peripherals, this minitower still has room for four empty drive bays and three free expansion slots. To top off the package, the system comes with Microsoft's very good Office 97 Small Business Edition. Dell's support policies are among the best, including round-the-clock toll-free support, plus free on-site service for the first year. Dell has recently enhanced its phone support by providing a special service-tracking number with every new system. When you call in, the company says, you'll be routed to a technician who knows the most about your type of machine and the kinds of problems you may encounter.



Dell Dimension XPS D266

4 CYBERMAX POWERMAX 7

PRO: Excellent price for a Pentium II-300, good support policies

CON: Slow for its processor class

The CyberMax PowerMax 7 is like a Florida time-share: It sounds like such a good deal you can't help but wonder what's wrong with it. So what's the catch to this loaded Pentium II-300 that's priced about $350 lower than similarly configured PCs? Not much. With a PC WorldBench 98 score of 152, the PowerMax hums along at a speed slightly below average for a PII-300—but certainly fast enough for most office tasks.

For $2199, the PowerMax 7 comes equipped with a spacious 8.4GB hard drive and a high-quality STB Velocity 128 AGP graphics card. Skeptics won't scoff at

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style[1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	2	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Sound Blaster AWE64	midtower	384	2	3/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Sound Blaster AWE64	midtower	768	1	3/0	3	4/4	24	Sat., Sun.	WWW
12X-24X	Super Sound32 32W-3D	midtower	512	2	3/0	4	4/4	24	Sat., Sun.	WWW
12X-24X	Ensoniq Audio PCI	midtower	384	2	3/0	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	none	midtower	512	2	3/3	5	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Sound Blaster AWE64	midtower	256	1	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-24X	none	midtower	512	2	3/3	5	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Ensoniq Audio PCI	midtower	512	3	3/2	4	varies [4]/1	15.5	Sat.	WWW
12X-24X	CS37-3DIS	midtower	256	4	3/0	4	3/5	24	Sat., Sun.	WWW
12X-24X	Yamaha OPL3-Sax	midtower	1024	3	3/0	3	3/5	24	Sat., Sun.	WWW
14X-32X	S3 Sonic Vibes	minitower	1024	2	3/1	4	3/1	9	none	BBS, WWW
12X-24X	Ensoniq Audio PCI	midtower	512	2	3/1	5	varies [5]/3	12	Sat.	BBS, WWW
12X-24X	ESS ES1B6B	midtower	512	4	2/1	3	1/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Ensoniq Audio PCI	midtower	768	2	3/1	3	3/5	10	Sat.	BBS, WWW
14X-32X	Ensoniq Audio PCI	midtower	384	3	3/0	3	5/3	24	Sat., Sun.	BBS, WWW
12X-24X	Sound Blaster 16 PnP	midtower	256	1	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-24X	Ensoniq Audio PCI	midtower	256	2	3/2	3	varies/1	15.5	Sat.	WWW

[1] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Five years on CPU and main RAM, three years on other parts.
[5] Five years on CPU and system memory, three years on all other parts.

the monitor either: The 17-inch display is crisp and bright, and it's easy to adjust.

A peek under the PowerMax's hood reveals connector cables that are nicely bunched together and parked out of the way. The four open expansion slots and two free RAM sockets are all easy to reach.

The documentation that comes with this machine is, in essence, a rewrite of the Windows 95 manual. You'll probably need to turn to technical support if you have any questions about your hardware. We found CyberMax's free phone support friendly, responsive, and knowledgeable. And it's available around the clock.

CyberMax PowerMax 7

5 MICRO EXPRESS MICROFLEX-B2450

PRO: Inexpensive, top-notch configuration, 2X DVD-ROM drive

CON: Support quality could be better

Whether you're a small-business user or someone in a larger company looking for good midrange computing power, the MicroExpress MicroFlex-B2450 is a good buy. Its PC WorldBench 98 score of 140 outruns all other AMD K6-233—and Pentium MMX-233—machines we've tested, and its $1499 price tag makes it one of the cheapest. Best of all, if you're dying for DVD, this is one of the first sub-$2000 models we've seen with a DVD-ROM drive.

We were impressed with the B2450's configuration: It's one of only two machines we've tested that carry a full 1MB of secondary cache. (The Everex AGI MMX 233, in spot 16 of the budget chart, is the other.) If you want to tinker, just remove four screws and crack open the tan case: Inside, you'll find plenty of empty and easily accessible slots and drives. Your ISA real estate is already filled with a Rockwell K56flex modem and a standard Sound Blaster 16-bit audio card, but three slots are available.

Micro Express B2450

Elsewhere, however, the MicroFlex-B2450 is light on multimedia extras. The MLi 818 speakers, for example, are small and a tad weak on the bass. And the ▶

4.3GB hard disk is on the skimpy side for an otherwise well-outfitted machine.

The MicroFlex-B2450 does come with clear documentation, and the company's toll-free technical support is available around the clock. But make sure that you have your computer's serial number in hand when you call: In our last round of anonymous calls to check support quality, we found the technicians somewhat abrupt and reluctant to help until we supplied the number.

New This Month

The following PCs made our budget desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

7 TAGRAM THUNDERBOLT H2630 PENTIUM II 333

PRO: Great price for a Pentium II-333 system

CON: Difficult to upgrade

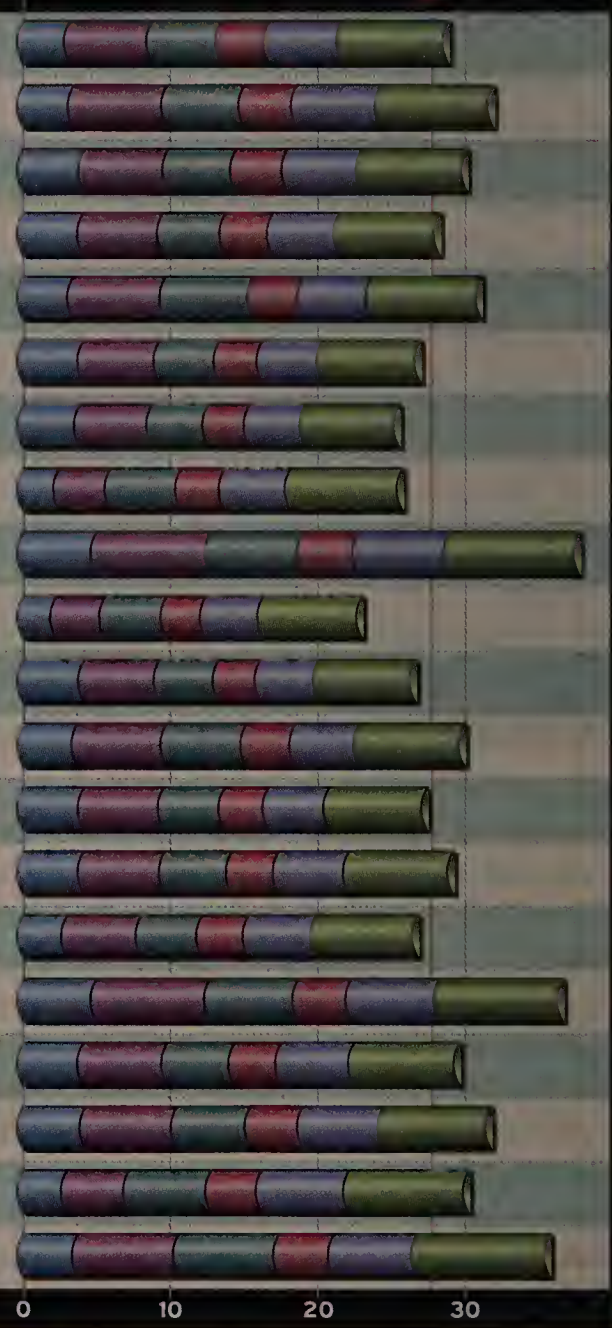
Lightning strikes bargain hunters in the form of the Tagram Thunderbolt H2630 Pentium II 333, the first PII-333 system to earn a place on our budget chart.

Priced at $2199, the Thunderbolt costs no more than the number three Dell Dimension XPS D266, a Pentium II-266 machine. And the Thunderbolt's PC WorldBench 98 score of 171 is 22 percent higher than the Dell's; the H2630 has a larger hard drive (6.4GB versus 4GB); and it comes with an Iomega Zip drive, which the Dell lacks. ▶

TOP 20 BUDGET DESKTOPS

TEST REPORT

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC World-Bench score
1	Gateway G6-266b*	Pentium II-266	Win 95	32	512	144
2	Gateway E-3110 233*	Pentium II-233	Win 95	32	512	135
3	Dell Dimension XPS D266*	Pentium II-266	Win 95	32	512	142
4	CyberMax PowerMax 7*	Pentium II-300	Win 95	64	512	152
5	Micro Express MicroFlex-B2450*	AMD K6-233	Win 95	64	1024	140
6	Micro Express MicroFlex-F300B	Pentium II-300	Win 95	64	512	161
7	Tagram Thunderbolt H2630 PII 333	Pentium II-333	Win 95	64	512	171
8	Quantex QP6/233 SB-3x	Pentium II-233	Win NT 4.0	64	512	170
9	Micron Millennia Mme	Pentium MMX-200	Win 95	32	512	115
10	Quantex QP6/266 SB-3X	Pentium II-266	Win NT 4.0	64	512	189
11	Kingdom Pinnacle 300/P2	Pentium II-300	Win 95	64	512	164
12	Polywell Poly K6266MX	AMD K6-266	Win 95	64	512	145
13	Polywell Poly 700L5 PII 300	Pentium II-300	Win 95	64	512	159
14	ProGen Polaris PII-266	Pentium II-266	Win 95	32	512	147
15	MidWest Micro Office Pro-300	Pentium II-300	Win 95	32	512	161
16	Everex AGI MMX 233	Pentium MMX-233	Win 95	32	1024	119
17	Micro X MPD-8000 PII 266	Pentium II-266	Win 95	32	512	145
18	Unicent Avanta L233	Pentium II-233	Win 95	32	512	135
19	Micron ClientPro MRE	Pentium MMX-233	Win NT 4.0	32	512	143
20	Kingdom Pinnacle M200+ V	Cx6x86MX-PR200	Win 95	32	512	122



*Best Buy

Word 97 · Word Pro 97 · Excel 97 · 1-2-3 97 · Paradox 8.0 · Picture Publisher 7.0

TEST PC WORLD CENTER

HOW WE TEST All systems are tested with PC World8ench 98, *PC World's* application-based benchmark. A higher PC World8ench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 95.

What drives John.

Menu of freeze-dried entrees

Spacecraft blueprints

The Unabridged History of Flight

9,000 documented simulator hours

Signed photo of first moon walk

Mission Control Manual

Collected squadron patches

Moon rocks

Crayon drawings from the Laguna 4th graders

Vintage vinyl collection

Fitness and medical reports

John's drive.

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Circle 251 on reader service card

Western Digital

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Tagram made some trade-offs to keep the price of the machine this low. For example, you get a 12X–24X CD-ROM drive, whereas many systems in this processor class feature 13X–32X models.

The Thunderbolt offers plenty of room for expansion—three free drive bays, two empty DIMM sockets, and four unused card slots. Our biggest problem was removing the case. You have to pry the bezel off the front of the system just to get to the three Phillips-head screws that secure the case to the PC's internal frame. And if you plan to add an extra hard drive, you'll need to drop by your local computer parts store to pick up some power cable splitters: The Thunderbolt has three empty bays, but only one power cable is available.

Tagram Thunderbolt PII 333

Tagram's warranty is fairly standard—three years for parts and one year for labor. Initially the company offers round-the-clock support, but after you've owned the machine for three years, technical support drops to 9 hours per day.

14 PROGEN POLARIS PII-266

PRO: Good price, relatively large hard drive

CON: Tough to upgrade, minimal support hours

The ProGen Polaris PII-266 is for the small-office or home-office user on a tight budget who wants decent computing power at a low price. The midtower's WorldBench 98 performance score of 147 is comparable to that of other Pentium II-266s we've tested, and at $1799 it's one of the least expensive models we've reviewed in its class. Overall, the Polaris also has a fine configuration—a good thing, since upgrading this machine is not very simple.

ProGen Polaris PII-266

Most of the Polaris PII-266's features are impressive. For example, the 8.4GB Maxtor hard disk offers significantly more storage than you'll find on other Pentium II-266s' drives. When you look at the 17-inch Panasonic PanaSync S70 monitor, you'll notice its rich color and clear detail.

We were disappointed with the inside of this white minitower: An extra metal support acts as a massive shield, blocking easy access to the drive bays and boards. Consider spending a few extra dollars up front for an additional 32MB of memory that someone else will install.

Because the Polaris PII-266's system and user docs aren't entirely accurate, you will probably end up calling ProGen's toll-free technical support number more than once. But with minimal weekday support hours and no weekend support to back it up, the ProGen Polaris PII-266 is not a machine for folks who work around the clock.

15 MIDWEST MICRO OFFICE PRO-300

PRO: Excellent price, good performance

CON: No modem, limited docs and service hours

Companies that are on the lookout for a no-nonsense business machine should consider the MidWest Micro Office Pro-300. With a PC WorldBench 98 score of 161, it performs slightly better than average for PCs in its processor class. And at $1999, it costs about $500 less than many similarly configured machines.

MidWest Micro Office Pro

This is a solid computer for people who live their business day inside the Microsoft Office 97 suite that comes preinstalled. If your company's IS staff plans to add a network adapter to provide access to the outside world, you won't mind that the Office Pro-300 doesn't come with a modem.

When you're ready to upgrade your RAM, you'll find that sliding open the machine's off-white case is easy. The interior is roomy, but you will have to negotiate through cables to get to the processor and the open DIMM sockets.

MidWest Micro's support could be better. The company limits its technical support to 12 hours on weekdays and 6 hours on Saturday. Moreover, when we called during those hours, one rep refused to offer us any assistance unless we were in front of the machine.

17 MICRO X MPD-8000 PII 266

PRO: Great price for a PC with a DVD-ROM drive

CON: Configuration is too basic, generic docs

At $1499, the Micro X MPD-8000 PII 266 is the cheapest Pentium II-266 machine we've reviewed. It's too thinly configured to make a well-rounded small- or home-office PC, but its low price and good performance are the best things about it—and they're far from insignificant.

Still, even before you buy it, this system is begging for an upgrade: You get a basic 32MB of system memory, a skimpy 3.2GB hard drive, and a bargain-basement 15-inch ADI ProVista E40 monitor that seems incongruous next to the Creative Labs DVD-ROM drive and the Ensoniq Audio PCI wavetable audio card. Who wants to play games on a grainy 13.6-inch-viewable window, anyway? Maybe that's why Micro X included an S-Video cable for patching the video into your TV set.

Micro X MPD-8000 PII 266

Upgrades also aren't an easy undertaking on this PC: We found it difficult to get to the processor and DIMM sockets—let alone squeeze our hands into the drive bays.

At least the help-desk technicians on Micro X's toll-free support lines were friendly and helpful during our anonymous calls. However, you can reach them for only a meager 10 hours Monday through Friday and 5.5 hours on Saturday. ▶

Beyond the Top 20: Online

online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **Digital PC 3500 6233**
- **DTK Apri 76M/P233**
- **DTK Quin-57M/PM233**
- **DTK Quin-73M/PM233**
- **Kingdom Pinnacle PR233**
- **Monorail NPC 7000**
- **NMC Pentium MMX-233**
- **ProGen Atlas MMX-233**
- **Racer Daytona 233GT**

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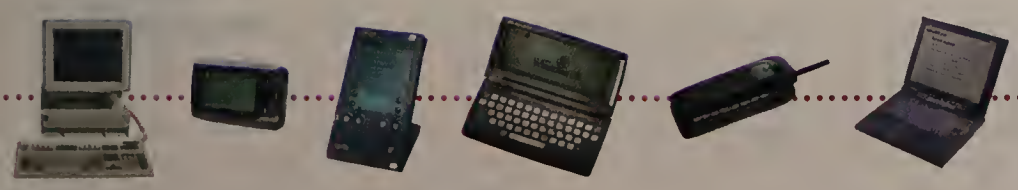

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- 24X CD-ROM Drive (maximum performance)§§
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- One-year at-home service (restrictions apply)
- Sony Interactive online support (www.ita.sel.sony.com/support/pc)

§K56flex™ technology products are capable of 56Kbps. Due to FCC rules that restrict power output, however, current download speeds are limited to 53Kbps (max). Upload speeds are limited to 33.6Kbps. Actual speeds may vary depending on line conditions. §§Data on a CD-ROM is read at a variable transfer rate, ranging from 10K at the innermost track to 24X at the outermost track (the data transfer standard 1X rate equals 150 kbytes/second and the average data transfer rate is 17X or 2250 kbytes/second).

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PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (3/11/98)	CPU	Comments
1	Quantex H 1331 800/896-4898 www.quantex.com	n/a	NEW	$3299	Pentium II-266	Desktop alternative comes with port replicator, extra battery.
2	Dell Inspiron 3200 D266XT 800/388-8542 www.dell.com	n/a	NEW	$3199	Pentium II-266	SOHO notebook offers rare mix of latest CPU and low price.
3	Dell Latitude CP M233XT 800/388-8542 www.dell.com	n/a	Jan 98	$3699	Pentium MMX-233	Fully loaded corporate model is best of its CPU class.
4	Compaq Armada 4220T 800/345-1518 www.compaq.com	3	May 98	$3999	Pentium MMX-266	Unusual design, killer battery make Armada a superb traveler.
5	Sony VAIO PCG-719C 800/476-6972 www.sony.com/pc	4	May 98	$2999	Pentium MMX-233	A slimmed-down notebook perfect for the budget traveler.
	BUDGET NOTEBOOKS					
1	WinBook XL K6 233 800/965-9349 www.winbook.com	4	May 98	$2283	AMD K6-233	$275 price cut on multipurpose notebook makes it number one.
2	Gateway Solo 2300 SE 800/846-2000 www.gateway.com	n/a	NEW	$1949	Pentium MMX-200	First PMMX-200 under $2000 works well as a desktop alternative.
3	CTX EzBook 774 MT-MK 800/888-9052 www.ctxintl.com	2	May 98	$2049	Pentium MMX-200	Inexpensive tote-along for college students who surf the Web.
4	Acer Extensa 394T 800/733-2237 www.acer.com/aac	3	May 98	$2499	Pentium MMX-200	Strong battery, light weight make it best roadster on budget chart.
5	Quantex H 1330 800/896-4898 www.quantex.com	n/a	Mar 98	$2699	Pentium MMX-233	$300 price drop gives you great performance at a bargain price.

Best Buy See features chart, page 250.

n/a = not applicable [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] For more information about all products in this table, circle reader service no. 902.

ADDICTS ALWAYS PAY for their cravings. Consider the computer industry's addiction to speed, exemplified by the new Pentium II notebooks. We tested five of them for our June Top 10. They fly at record-breaking speed—about 18 percent quicker in our PC WorldBench tests than their Pentium MMX predecessors. But to achieve hot-rod performance, vendors have tossed battery life out the window: Our tests reveal a dramatic reduction of about 30 percent.

This makes a bad situation worse for travelers, who have complained for years about weak notebook batteries. "I already have to carry three batteries for long flights," groused one San Francisco business traveler about the new PIIs.

But for those who can put up with lackluster battery life in exchange for great performance at a relatively low price, these notebooks stand out. We tested 16 laptops in all, and two of the PIIs—the Quantex H 1331 and Dell Inspiron 3200 D266XT—capture the top spots on the power chart. On the budget side, the Gateway Solo 2300 SE—our first sub-$2000 PMMX-200 notebook—takes the number three slot. The low price is a sign of the escalating notebook price war, which prompted Compaq to break the $1000 barrier in March with its P-133 Armada 4131T, an older unit we haven't tested.

Meanwhile, Micron pulled the plug on its Transport XKE 266 and Meridian, our two Best Buys in May. We will review Micron's new offerings—destined for battle with Dell's Latitude and Inspiron lines—in August.

Let's hope the next campaign is a battle over battery life.

Quantex H 1331

This Month's Best Buys

POWER NOTEBOOKS

1 QUANTEX H 1331

PRO: Comes with port replicator, second battery, and carrying case

CON: Cramped keyboard

When Quantex throws in a $169 port replicator with its new H 1331 notebook, the message to consumers is clear: Use this Pentium II system as a desktop alternative.

That's not a bad idea. For starters, you get desktoplike performance with the Quantex H 1331. The Pentium II-266 CPU, backed by 64MB of SDRAM, posted a sizzling PC WorldBench score of 142, placing the inexpensive $3299 Quantex among the fastest notebooks we've ever tested. Second, the notebook's 4GB hard drive gives you ample space for software and data. And if you don't use an external moni-

SCORECARD

★ Overall rating	PC WorldBench score/ performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	Reader service number [2]
91	142/outstanding	inexpensive	[3]	outstanding	[3]/fair	2:54/poor	average	610
91	145/outstanding	inexpensive	average	outstanding	average/fair	2:58/poor	average	611
85	112/good	average	average	outstanding	average/good	5:43/good	average	612
84	120/very good	average	average	good	above average/good	7:27/outstanding	light	613
84	109/good	inexpensive	[3]	outstanding	[3]/fair	5:31/good	light	614
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
84	114/outstanding	average	average	good	average/poor	6:22/very good	average	615
83	103/very good	inexpensive	average	satisfactory	below average/fair	5:52/good	average	616
83	100/very good	inexpensive	[3]	very good	[3]/poor	5:38/good	average	617
83	101/very good	expensive	[3]	very good	[3]/fair	8:20/outstanding	light	618
82	113/outstanding	expensive	[3]	outstanding	[3]/good	5:46/good	average	619
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	

[3] Insufficient data to give a rating.

tor, the notebook's 13.3-inch active-matrix screen is big enough to seem like one.

The solid H 1331 isn't the sharpest-looking notebook around, but it is well built, with no discernible flex in the body or screen panel. Even the CD-ROM drive's tray mechanism is unusually stable. The ports on the back aren't covered but are recessed out of harm's way.

You'll appreciate the sturdiness when hitting the road with this 7.4-pound unit (an average weight for a notebook but light for a desktop alternative). You will *not* like its miserable battery life of less than 3 hours—a by-product of the power-hungry PII processor. To make this system's short battery life less painful, Quantex includes a second $169 battery. You also get an inexpensive carrying case.

Generally, the H 1331 is comfortable to use. Its display is easy on the eyes though not as bright as some screens—a problem only under the harshest lighting conditions. The small, rectangular keyboard has firm action but is padded with too many keys. The alphanumeric keys are of normal size, but most others are too small, and easy to miss when touch-typing. We found the touchpad to be finely tuned.

You get the security of a well-written, nicely illustrated user guide and a three-year warranty on the CPU and memory, but there's only one-year coverage on other parts and labor. Quantex's round-the-clock telephone technical assistance has been sporadic: In our anonymous calls over several months, we received adequate advice, but twice we had to wait for longer than 30 minutes to receive help.

WinBook XL K6 233

BUDGET NOTEBOOKS

1 WINBOOK XL K6 233

PRO: Fine performance; touchpad and eraserhead

CON: Comparatively heavy; poor support policies

WinBook's XL K6 233 demonstrates that Intel processors now face some serious competition in the notebook arena. Powered by the new mobile version of AMD's K6-233 chip, the XL will appeal to buyers who are looking for hot performance at a budget price.

AMD's challenge has been to produce CPUs that outperform Intel's or cost less. The XL K6 233 suggests that AMD has done both. At $2283, it's $800 cheaper than the average PMMX-233 portable to pass through our doors, and it outperforms most of them.

Beyond its charcoal-gray good looks, the XL K6 233 has a crisp keyboard and comes with both a touchpad and an eraserhead. You won't have to swap components either, because the 12X–20X CD-ROM drive, floppy drive, and K56flex modem are all internal.

At 8.4 pounds, the WinBook isn't svelte. But you'll like its 6.3 hours of battery life, and the notebook's sturdy design will help it withstand the rigors of the road. If you make presentations outside the office, you'll appreciate the video-out port.

The system's documentation is first-class, though support policies are thin: ▶

PHOTOGRAPHS: KEN SMITH

TOP 10 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Quantex H 1331*	Pentium II-266	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
2	Dell Inspiron 3200 D266XT	Pentium II-266	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
3	Dell Latitude CP M233XT	Pentium MMX-233	7.4	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
4	Compaq Armada 4220T	Pentium MMX-266	7.2	32	4	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
5	Sony VAIO PCG-719C	Pentium MMX-233	6.4	32	2.1	active	12.1	1024 x 768	16.8 million	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	WinBook XL K6 233*	AMD K6-233	8.4	32	2	active	12.1	800 x 600	65,536	lithium ion	eraserhead, touchpad
2	Gateway Solo 2300 SE	Pentium MMX-200	8	32	2	dual-scan	12.1	800 x 600	16.8 million	NiMH	touchpad
3	CTX EzBook 774 MT-MK	Pentium MMX-200	8.2	40	2	active	12.1	800 x 600	65,536	NiMH	touchpad
4	Acer Extensa 394T	Pentium MMX-200	7.2	32	3.2	active	12.1	800 x 600	65,536	lithium ion	touchpad
5	Quantex H 1330	Pentium MMX-233	7.6	64	3.2	active	13.3	1024 x 768	65,536	lithium ion	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

WinBook takes calls only 13 hours a day and not on Sundays. When staff did pick up the phone, however, we found the support to be better than most.

New This Month

The following PCs made our power and budget notebook charts for the first time this month. To find original reviews of previously tested notebooks on this month's charts, visit our Web page (www.pcworld.com/t20pcs).

POWER NOTEBOOKS

2 DELL INSPIRON 3200 D266XT

PRO: Speedy performance, sturdy construction

CON: Poor battery life, no modem

The Inspiron 3200 D266XT demonstrates why Dell is a notebook industry leader. Normally, hot new CPUs jack prices up. But for $3199, this Pentium II Inspiron costs less than some similarly configured Pentium MMX units.

The Inspiron packs plenty of muscle. The PII-266 chip feeds off 64MB of SDRAM and a 4GB hard drive, helping the notebook post the highest performance score on the chart. The downside of all this power: a poor 3-hour battery life.

Dell Inspiron D266XT

If you're a fan of minimalism, you'll like the Inspiron's simple black design. Behind the unassuming exterior you'll find rock-solid construction with virtually no flex. A single modular bay accepts either the 12X–24X CD-ROM drive or a floppy drive. The battery resides in its own proprietary cove. You can access the hard drive and memory easily by removing a panel that's secured by two screws.

The notebook's multimedia features, though, are less than outstanding. The 13.3-inch screen isn't as bright as it could be, and as with many notebooks, the Inspiron's speakers are audible only in quiet environments. For MIDI file playback, Dell includes Yamaha's S-YXG50 software wavetable synthesizer, a nice touch.

We liked the keyboard's firm feel, but if you've got big fingers, the undersize <Ctrl>, <Alt>, <Shift>, and <Enter> keys might be a problem. If the touchpad is too jumpy or sluggish, you can easily adjust it via the mouse properties in the Control Panel.

Dell provides superlative online and print documentation and the typical one-year warranty. Also typical is the company's spotty 24-hour technical support. In our recent calls, we had to wait up to 18 minutes to talk with staffers, who then answered two of our three questions inadequately.

Too bad Dell's service doesn't keep pace with its notebook's performance.

BUDGET NOTEBOOKS

3 GATEWAY SOLO 2300 SE

PRO: Great price, good performance

CON: Dual-scan screen, no modem

The notebook price war has led to another first—Gateway's Solo 2300 SE, the first Pentium MMX-200 notebook we've seen to break the $2000 price barrier.

Not too long ago, you had to shell out $3000 for this class of notebook. Now for a budget price of $1949, you get the fastest PMMX-200 portable we've tested in a long time.

How did Gateway get the price down? It left out a modem, and went with a 12.1-inch dual-scan screen instead of using costlier active-matrix technology. Like most dual-scan displays, the Solo's is difficult to view from anywhere but directly in front of it. The screen was also unevenly lit. These limitations will drive graphic designers nuts, but most people who process words and crunch numbers on their notebooks will be satisfied with the screen and happy to save a little money.

You can also take advantage of the Solo's

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
12X-20X	56 [2]	144	1	●	○	●	varies[3]/1	24	Sat., Sun.	BBS, WWW
12X-24X	not included	144	1	●	○	●	1/1	24	Sat., Sun.	BBS, WWW
12X-20X	not included	128	2	●	●	●	3/1	24	Sat., Sun.	BBS, WWW
not included	not included	96	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
1X-14X	33.6	128	1	●	●	●	1/1	24	Sat., Sun.	WWW
12X-20X	56 [2]	128	0	○	○	●	1/1	13	Sat.	BBS, WWW
8X-20X	not included	192	1	○	●	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
12X-20X	33.6	40	2	●	○	●	1/1	12	none	WWW
8X-20X	33.6	128	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
8X-20X	56 [2]	144	2	●	●	●	varies[3]/1	24	Sat., Sun.	BBS, WWW

[3] Three years on CPU and main RAM, one year on other parts.

docking station port and turn the boxy gray notebook into a desktop alternative with an external monitor. Or you can pull the 8-pound system from the docking station and bring it home or on short trips—without tearing your rotator cuff. When you're away from a wall socket, you'll appreciate the Solo 2300 SE's battery life of nearly 6 hours. But if you travel a lot, do yourself a favor and buy a lighter portable.

Gateway Solo 2300 SE

This solid-feeling Solo has several useful design features not found on all notebooks. The port covers fold all the way back and attach to the bottom of the unit—a clever trick that helps prevent the covers from breaking. In addition, the snap-out hard drive makes it easy to remove data from your notebook and lock it in a drawer for safekeeping.

The speakers produce unusually clear sound for a notebook, but their placement near the wrist rests might be a problem if you have large hands. The Solo's single modular bay holds either a CD-ROM drive or a floppy drive. An optional external cable will let you connect both.

The keyboard is adequate—neither too crisp nor mushy. The function keys are large and the touchpad is adequately responsive. But the buttons below the touchpad are a little too small for comfort.

In each of our technical support calls to Gateway this month, hold time was less than 10 minutes, which we consider good. But the advice could've been better: The staff resolved our modem problem correctly but blew our hard drive question.

Near Misses

Thirteen of the 16 notebooks we tested this month failed to earn positions on our charts. Two, however, came close and deserve to be highlighted. The remaining 11 are listed in the box at right.

BIG BLUE SAW a hole in its product lineup and filled it with the IBM ThinkPad 600. This notebook occupies the middle ground between the waiflike ThinkPad 560 and the beefy 770. It has a modular bay for either a floppy drive or a CD-ROM drive—an improvement over the 560. And the new model doesn't include some of the 770's multimedia features, which most owners don't need. The 600's Pentium II-266 processor gives it dragster speed. The keyboard, construction, and three-year warranty are also outstanding. The problem? A high $4934 price tag.

Another power contender, Gateway's Solo 5100 LS, is our recommended travel unit in this month's notebook roundup (see "Different Notes for Different Folks"). It offers the front-row clarity of a 14.1-inch display, at balcony-seat pricing. Even with the large screen, the notebook is a light 6.4 pounds. Throw in a respectable battery life of nearly 6 hours, and you have a worthy travel mate for $3199.

But Gateway's subpar support quality helped keep the Solo 5100 LS off our power chart, which rates the entire notebook, not just its travel features. ■

Beyond the Top 10: Online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 10 Notebook PCs chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **Compaq Armada 1592DMT**
- **Compaq Armada 7792DMT**
- **Digital HiNote Ultra 2000**
- **DTK FortisPro Top5A233**
- **Fujitsu LifeBook 735Dx**
- **IBM ThinkPad 380XD**
- **IBM ThinkPad 380XD (Pentium II)**
- **NEC Versa 5080X**
- **Toshiba Satellite 315CDS**
- **Toshiba Tecra 780DVD**
- **Transmonde Vibrant 166TMX**

PC WORLD

TOP 10 HOME PCs

	POWER SYSTEMS	Last month	Month tested	Street price (3/11/98)	Comments
1	Micron Millennia XKU 266 888/634-8799 www.micronpc.com	1	May 98	$2249	**PRO:** Speedy Pentium II, second cheapest on power chart, first-rate reliability and support ratings. **CON:** Bundled applications not preinstalled, setup instruction scanty in places.
2	Micron Millennia XKU 300 888/634-8799 www.micronpc.com	2	retested[1]	$2723	**PRO:** Second-fastest system on power chart, terrific sound system. **CON:** Pricey, somewhat limited software bundle.
3	Dell Dimension XPS D300 800/388-8542 www.dell.com	3	retested[1]	$2499	**PRO:** Loaded home-entertainment power machine, first-class reliability and support ratings. **CON:** Not cheap, limited software package, novices will find setup instructions inadequate.
4	Gateway G6-266 Perfect Scholar PC 800/846-2000 www.gateway.com	4	May 98	$1999	**PRO:** Excellent range of software titles, great price for super performance. **CON:** Software manuals not very comprehensive.
5	Gateway G6-300h 800/846-2000 www.gateway.com	5	May 98	$2838	**PRO:** Great performance; comes with DVD-ROM drive, large monitor, generous software bundle. **CON:** Most expensive system on power chart.
	BUDGET SYSTEMS				
1	Dell Dimension XPS D233 800/388-8542 www.dell.com	1	retested[1]	$1679	**PRO:** Fastest PC on budget chart, great reliability and service ratings. **CON:** Rather expensive for budget system, skimpy software bundle, setup instructions need improvement.
2	Gateway G5-233 800/846-2000 www.gateway.com	2	May 98	$1499	**PRO:** Good starter PC with color printer, respectable variety of software titles. **CON:** Underpowered for demanding apps, small hard disk.
3	Gateway G6-233 HE 800/846-2000 www.gateway.com	3	May 98	$1699	**PRO:** Second-fastest budget PC, a cinch to set up. **CON:** Small hard disk, second most expensive Pentium II system on budget chart.
4	IBM Aptiva E26 800/426-7235 www.ibm.com/aptiva	5	May 98	$1298	**PRO:** Good tutorial programs, setup is a snap. **CON:** Slow performance, not suitable for video-intensive software.
5	HP Pavilion 3260 800/724-6631 www.hp.com	4	May 98	$1198	**PRO:** Cheapest system on Top 10, appropriate for first-time PC owners. **CON:** No secondary cache, minimal video RAM, slowest system on the chart.

Best Buy

[1] System retested in May 1998 using new PC World8ench 98 test suite.

WHAT, RERUNS ALREADY? If you think this month's budget and power charts look suspiciously like those that ran in May, you're right. Despite the challenge of new home PCs from Hewlett-Packard, IBM, and MidWest Micro for this month's testing, all ten May picks grace the charts for the second month in a row.

Once again, Pentium II systems occupy all five spots on the power chart and account for two of the machines on the budget list. For the most part, street prices are edging downward—and where they're not, manufacturers are quietly replacing older and slower components with faster ones. For example, CyberMax and NEC upgraded the CD-ROM drives on the systems we tested last month from 24X to 32X without a price hike. Still, that wasn't enough to help them crack our Top 10.

POWER SYSTEMS

MICRON'S PRICE cuts this spring propel its Millennia XKU 266 and XKU 300 minitowers into the number one and two slots. Once again, the $2249 XKU 266 is this month's Best Buy, balancing competitively priced Pentium II performance with superior reliability and support ratings. Add a feature set that includes a 6.4GB hard disk, an Iomega Zip drive, and a crisp 17-inch monitor, and you've got a great value on your hands.

Micron's Millennia XKU 300 loses out to its 266-MHz sibling only on price. This 300-MHz system, at $2723, is powerful enough to handle the most demanding programs out there, yet it's genteel enough to let you play high-fidelity music on its killer sound system (the XKU 300 comes with Cambridge Soundworks' MicroWorks speakers). Both XKU systems were a snap to assemble (lack of speaker installation instructions notwithstanding). Just one complaint: The systems' CDs and floppy disks were strewn around the accessories box as if they'd been tossed in as an afterthought.

Micron Millennia XKU 300

In third place is Dell's Dimension XPS D300, loaded with a DVD-ROM drive and top-notch audio but short on bundled software. The $2499 D300 is a good choice if you want to be entertained *and* run a serious home-based business. But you'll need to know your way around PCs, as the setup instructions are not very comprehensive.

As it did last month, Gateway snags the fourth and fifth spots. Its G6-266 Perfect Scholar PC offers the best family software bundle around, hands down. From Creative Writer 2 to 3D Movie Maker, there's something for any school-age child—as well as Microsoft Office 97 Small Business Edition for mom and dad. At $1999, the G6-266 Perfect Scholar is also the most affordable Pentium II

SCORECARD

★ Overall rating	PC World8ench 98 score/rating	Price	Reliability/ support	Setup	Features	Reader service number
80	151/outstanding	average	above average/ above average	good	Pentium II-266, 32MB of SDRAM, 6.4GB hard drive, 13X-32X CD-ROM drive, 56-kbps modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	601
79	165/outstanding	very expensive	above average/ above average	good	Pentium II-300, 64MB of SDRAM, 6.4GB hard disk, 13X-32X CD-RDM drive, 56-kbps modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	602
79	150/outstanding	expensive	above average/ above average	fair	Pentium II-30D, 32MB of SDRAM, 6.4GB hard disk, 2X DVD-ROM drive, Cinemaster II MPEG decoder card, 56-kbps modem, 17-inch monitor, AGP graphics card.	603
78	153/outstanding	very inexpensive	average/ above average	good	Pentium II-266, 64MB of SDRAM, 4.3GB hard disk, 12X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	604
77	172[2]/outstanding	very expensive	average/ above average	good	Pentium II-30D, 64MB of SDRAM, BGB hard drive, 2X DVD-ROM drive, 56-kbps modem, 19-inch monitor, AGP graphics card, TV tuner.	605
Power scorecard weightings ▶	Performance 30 percent	Price 15 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	
85	136/outstanding	expensive	above average/ above average	fair	Pentium II-233, 32MB of SDRAM, 4.3GB hard disk, 14X-32X CD-ROM drive, 56-kbps modem, 15-inch monitor, AGP graphics card.	606
83	81/fair	average	average/ above average	outstanding	Pentium MMX-233, 16MB of SDRAM, 2GB hard disk, 13X-32X CD-ROM drive, 56-kbps modem, 15-inch monitor, Canon BJC-4300 color bubble jet printer.	607
82	132/outstanding	expensive	average/ above average	outstanding	Pentium II-233, 32MB of SDRAM, 2GB hard disk, 13X-32X CD-ROM drive, 56-kbps modem, 17-inch monitor, AGP graphics card.	608
82	97/fair	inexpensive	average/ average	outstanding	AMD K6-233 with MMX, 32MB of SDRAM, 3GB hard disk, 12X-24X CD-ROM drive, 56-kbps modem, 15-inch monitor.	–
81	77/fair	very inexpensive	average/ average	outstanding	Pentium MMX-20D, 32MB of SDRAM, 2GB hard disk, BX-16X CD-ROM drive, 56-kbps modem, 15-inch monitor.	609
Budget scorecard weightings ▶	Performance 15 percent	Price 30 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	All products: 901

[2] The Gateway G6-3D0h's score is extraordinarily high for the system's processor class. The score may drop, pending further investigation.

PC in the power category.

Lastly, Gateway's $2838 G6-300h is the most expensive of the power home PCs, but it also has the most to offer—competitive speed, a TV tuner, a 2X DVD-ROM drive, and a gargantuan 19-inch monitor.

IBM Aptiva E26

BUDGET SYSTEMS

THREE BUDGET machines cling to their May positions. Dell's Dimension XPS D233 hangs on to the top spot despite its relatively high $1679 price. It's the speediest budget PC we've seen and is backed by great support and reliability ratings. The D233 is big on performance but not on software—you get Microsoft Office 97 Small Business Edition but not much more.

The $1499 Gateway G5-233—an entry-level Pentium MMX-233 PC complete with Canon's BJC-4300 printer and tons of home productivity titles— slips in at number two. It's a great value for the first-time owner if a color bubble jet printer is what you want. But with black-and-white lasers starting at $249, you can always opt to buy the right printer to suit your own needs (see Top 10 Printers).

Gateway also nails the third spot with its $1699 G6-233 HE. Its undersize 2GB hard drive is offset by the snappy 17-inch monitor and comprehensive home-oriented software bundle, making this model a sensible choice for a home office with basic business-computing needs.

Thanks to a $50 drop in the monitor price, IBM's Aptiva E26 moves up a notch to number four. The E26's best attribute is its price tag: $999 ($1298 with 15-inch monitor). A middle-of-the-road performer, the E26 is not powerful enough to handle heavy-duty video. What it does best is help you keep track of your small business (with the assistance of the bundled Lotus SmartSuite 97) and give your kids an inexpensive PC on which to play and learn.

HP's Pavilion 3260, in fifth place, rounds out the budget list. Even though its PC WorldBench score of 77 makes it one of the slowest home PCs we've ever tested, the 3260 is a steal at only $799 ($1198 with monitor). This HP is not meant for experienced users—it's geared toward first-time PC owners who need just enough speed and storage for word processing and cruising the Internet. The Pentium MMX-200 processor, 2GB hard drive, and 56-kilobits-per-second modem provide more than enough power to do just that—all for the cost of a very nice refrigerator.

—*Susan Silvius*

Susan Silvius is an occasional contributor to PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

Beyond the Top 10: Online

We also evaluated the following systems this month, but they didn't score high enough to make the Top 10 Home PCs list. For write-ups, see PC World Online (www.pcworld.com/t10homepcs).

- **HP Pavilion 8240**
- **IBM Aptiva E46**
- **MidWest Micro PRH-333**
- **MidWest Micro PRH-233**

PHOTOGRAPHS: KEN SMITH

Our Latest Monitor Success Story Has Been Significantly Condensed.

Thinnovation. You already know that Mitsubishi practically wrote the book on award-winning CRT monitor design. Now we've combined dazzling image quality, higher contrast and extraordinary brightness in a fraction of the size. Featuring a distortion-free TFT active matrix screen, increased color clarity and crystal-clear, flicker-free images, Mitsubishi's 14" and 15" LCD models (LCD40 and LCD50) are ideally suited for any application where space is at a premium. In fact, the ultra-thin LCD monitors use nearly 90% less desktop space than a standard CRT display. Mitsubishi's LCD monitors offer a true display solution for anyone looking for high-performance in a compact, lightweight design. Contact Mitsubishi Electronics today and we'll send you the condensed version of our latest monitor success story.

USA: 1-800-843-2515 • Canada: 1-800-387-9630 • www.mitsubishi-display.com/pwd/
QWIKFAX: 1-800-937-2094 (Document #1015)

Mitsubishi LCDs	LCD40	LCD50
Viewable size	14.0"	15.0"
Max Resolution	1024 x 768/75 Hz NI	1024 x 768/75 Hz NI
Weight	9.9 lbs.(4.5kg)	11.7 lbs.(5.3kg)
Dimensions (H,W,D)	14.7 x 14.0 x 6.3"	15.4 x 14.7 x 6.3"
Brightness	180 cd/m²	200 cd/m²
Viewing Angle	H: ±70°, V: +60, -50°	H: ±70°, V: +70, -50°
LCD Type	TFT Active Matrix	TFT Active Matrix

MITSUBISHI
DISPLAY PRODUCTS
*Innovation On Display*sm

Designed for Microsoft Windows 95

Mac OS

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Circle 144 on reader service card

PC WORLD

TOP 10 PRINTERS

	MONOCHROME PERSONAL PRINTERS	Month tested	Street price (3/1/98)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	Minolta PageWorks 6L 888/264-6658 www.minoltaprinters.com	Dec 97	$299	83	5.2	3.2	**FEATURES:** Laser, rated 6 ppm. Standard 256KB of RAM, 600-by-600-dpi maximum resolution, 150 sheets input, 100 output. **PRO:** Pretty good text quality, easy to use, sturdy construction despite small size, low price. **CON:** Gray scales are a little fuzzy and dark, documentation could be better.	685
2	Okidata OkiPage 6e 800/654-3282 www.okidata.com	NEW	$314	81	5.1	3	**FEATURES:** LED, rated 6 ppm. Standard 2MB of RAM, 1200-by-300-dpi maximum resolution, 100 sheets input and output. **PRO:** Good print quality, small footprint, simple control panel and overall construction. **CON:** Ties for slowest text speed on monochrome chart, somewhat expensive.	686
3	NEC SuperScript 860 800/632-4636 www.nec.com	Dec 97	$399	82	7	3.4	**FEATURES:** Laser, rated 8 ppm. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 50 output. **PRO:** Blistering text speed, easy-to-create booklets, two-year warranty. **CON:** Blotchy gray-scale graphics, user must change settings for pages to collate in proper order.	687
4	HP LaserJet 6Lse 800/752-0900 www.hp.com	Dec 97	$399	80	5.1	2	**FEATURES:** Laser, rated 6 ppm. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 100 sheets input and output. **PRO:** Strong print quality and paper handling, convenient design, excellent manual. **CON:** Expensive, slowest printer on monochrome chart, software bundle is not very useful.	688
5	NEC SuperScript 660plus 800/632-4636 www.nec.com	Dec 97	$249	81	5.2	3.3	**FEATURES:** Laser, rated 6 ppm. Standard 256KB of RAM, 600-by-600-dpi maximum resolution, 150 sheets input, 100 output. **PRO:** Inexpensive, includes CD-ROM of fonts and clip art, prints exit in correct order (unlike 860 model), quiet. **CON:** Inadequate documentation, fragile paper trays.	689
	COLOR PERSONAL PRINTERS							
1	Lexmark 5700 Color Jetprinter 800/539-6275 www.lexmark.com	NEW	$249	81	2.8	0.4	**FEATURES:** Ink jet, rated 8 ppm monochrome/4 ppm color. Standard 256KB of RAM, 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **PRO:** Inexpensive, good print quality including clean text and detailed graphics, good speed, quiet, easy to use. **CON:** Weak black ink can make colors a bit flat.	690
2	Canon BJC-4300 800/652-2666 www.ccsi.canon.com	Dec 97	$199	80	2	0.3	**FEATURES:** Ink jet, rated 5 ppm monochrome/2 ppm color. 720-by-360-dpi maximum resolution, 100 sheets input and output. **PRO:** Very inexpensive, good print quality on ink jet stock, great manual and software, easy to install and use. **CON:** Quality could be better on plain paper, slowest printer on color chart.	691
3	Epson Stylus Color 800 800/463-7766 www.epson.com	Dec 97	$349	80	3.8	1.1	**FEATURES:** Ink jet, rated 8 ppm monochrome/7 ppm color. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **PRO:** $50 price drop, two-year warranty, includes network options, vivid color, fastest graphics printing on color chart. **CON:** Still expensive, gray scales look harsh.	–
4	Canon BJC-7004 Photo 800/652-2666 www.ccsi.canon.com	Dec 97	$349	79	2.3	0.3	**FEATURES:** Ink jet, rated 5 ppm monochrome/3.5 ppm color. 1200-by-600-dpi maximum resolution, 130 sheets input and output. **PRO:** $50 price drop, good print quality, great color on coated paper, excellent manual. **CON:** Expensive, doesn't include standard color cartridge in box, confusing software, noisy.	692
5	HP DeskJet 722C 800/752-0900 www.hp.com	Dec 97	$299	77	4.1	0.3	**FEATURES:** Ink jet, rated 5 ppm monochrome/1.5 ppm color. 600-by-600-dpi maximum resolution, 100 sheets input, 50 output. **PRO:** $50 price drop, easy to use, quiet, good color quality, text looks great on plain paper and prints fast. **CON:** No toll-free tech support, documentation is a bit disorganized.	693

Best Buy — Windows 95-certified Plug and Play — All products: 904

HOW WE TEST The overall rating for both monochrome and color personal printers is based on print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

LIKE DESERT FLOWERS after an overdue rain, color personal printers burst into bloom this month—and some models smell sweet indeed, so to speak. The Lexmark 5700 Color Jetprinter is the best new color model we've seen in a while. Quiet, easy to use, and capable of good text and color, it unseats the Canon BJC-4300, our Best Buy since October. This $199 Canon is still a good choice, but the $249 Jetprinter is faster and prints better. ▶

Okidata's tiny, well-designed OkiPage 6e is the new runner-up to our long-running monochrome Best Buy, the Minolta PageWorks 6L. Three other new models we tested didn't make it: Lexmark's 7200 Color Jetprinter, which we've reevaluated twice due to driver problems, and color models from Alps and Hewlett-Packard.

If you've never heard of the Canon BJC-7004 Photo, our number four color printer, that's not because it's new. In fact, it's the same printer as Canon's discontinued BJC-7000 (number two in April). To appeal to photo printing fans, Canon replaced the 7000's standard color cartridge with a photo ink cartridge and cut the price $50 to $349. If you're not into photo printing, you'll need to buy the $20 standard color ink separately. Two other manufacturers also whacked $50 off this month—Epson, whose Stylus Color 800 is now $349, and HP, whose DeskJet 722C has dropped to $299. Finally, we learned that the street prices we quoted in April for the NEC SuperScript 860 and SuperScript 660plus included a $50 rebate; we've adjusted their prices back up to reflect what you'll see in stores.

LEXMARK'S BETTER DEAL

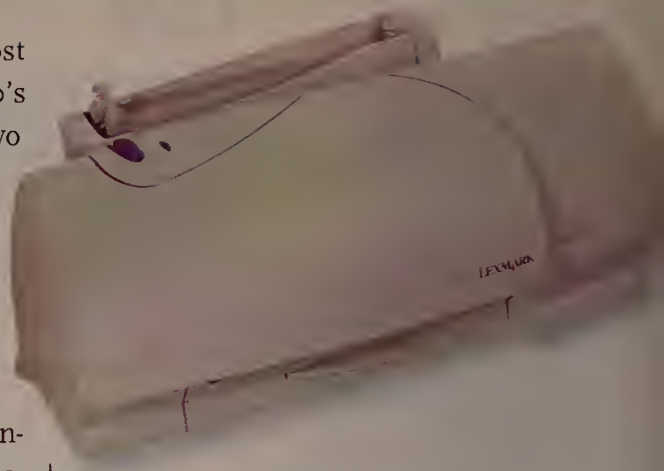
OUR NEW BEST BUY, Lexmark's 5700 Color Jetprinter, is similar in many ways to the problematic 7200 Color Jetprinter. Because they have the same engine, they print at similar speeds—text at around 3 pages a minute and graphics at almost half a page a minute. Now that the 7200's color-bleaching problem is fixed, the two also offer similar output: clean text with minimal jaggedness, and graphics with good detail—despite a light black ink that slightly softens text and color.

The entry-level 5700 is a better value: At $249, it's $100 cheaper. In addition to its lower price, the 5700's simpler construction, clear documentation, photo-editing CD-ROM, and quietness make it especially good for home use. The pricier 7200 adds only a tougher construction, a larger paper bin, and some business-oriented software (a choice of a photo-printing kit or a home-office software pack, including Peachtree Accounting and *Inc.* magazine's business planner). The 7200 has no printed manual; all of its documentation is on CD.

Okidata's new $314 OkiPage 6e isn't a stunner, but it's a steady performer—and it won't hog space. The 6e prints dark, but detailed. Its speed is average for its engine rating—over 5 pages of text and 3 pages of graphics a minute. And for a laser, it's unusually simple—the single button controls the power, and the toner drum fits smoothly. One more plus: At 12.6 by 14.2 by 6.9 inches, it'll fit almost anywhere.

HP: BIG AS LIFE

NEED A GOOD-QUALITY color printer that can handle oversized jobs? HP's DeskJet 1120Cse doesn't make our chart because of its price ($499), but it prints exquisite colors, palpable textures, and fine detail on paper up to 13 by 19 inches.



OUR NEW BEST BUY, the $249 Lexmark 5700 Color Jetprinter prints better and faster than its predecessor—affordably.

The catch? Quirky settings. Unlike most printers, which don't improve much in high-resolution mode (oddly enough), the 1120Cse needs the high setting for its best prints. In default mode the grays are fuzzy and the colors adequate, but in high resolution the 1120Cse shines. Fortunately, the high setting doesn't slow the printer too much. And if you'll only print text or drafts of graphics, the 1120Cse cooks in default mode. It turns out almost 4 pages of text per minute (faster, among the color printers, than all but the fifth-ranked HP DeskJet 722C), and nearly half a page of graphics per minute (second only to the Epson Stylus Color 800, our number three color printer).

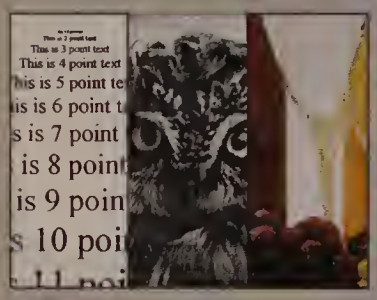
ALPS: NOT A PEAK EXPERIENCE

NOISY, SLOW, grid-marked output. That just about sums up the MD-1000, Alps' latest dry-ink printer. Like all other Alps printers, the new MD-1000 uses ribbons instead of ink cartridges. On the plus side, nonliquid ink doesn't spray or scatter, so the MD-1000 offers perfect precision, particularly with black text. Unfortunately, the MD-1000's graphics haven't moved beyond what color ink jets offered a couple of years ago. Colors lack subtlety and punch. Worse, gray-scale images show a grid pattern. Factor in the wait time—more than a minute for a page of text and 5 minutes for a page of graphics—and you've got a mountain of problems.

—*Dan Littman* ■

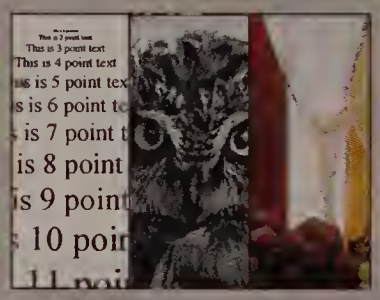
PRINT QUALITY SAMPLES

New Printers From Lexmark, Alps, Okidata



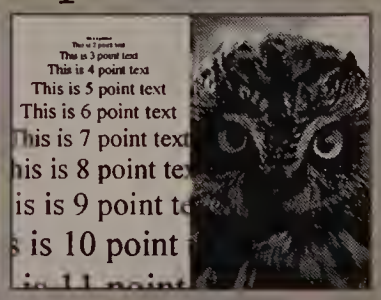
LEXMARK 5700 CJ

Lexmark's Best Buy, the 5700 Color Jetprinter, shines with clean text, detailed gray-scale graphics, and realistic (though slightly soft) color.



ALPS MD-1000

Its laser-quality text impressed us, but the Alps MD-1000's gray scale shows a distinct gridlike texture, and its fuzzy color doesn't equal an ink jet's.



OKIDATA OKIPAGE 6E

New to our monochrome chart at number two this month, the OkiPage 6e offers even, readable text and adequate, if dark, graphics. We also like its small size.

WHEN THE PROS TESTED THE NEW HITACHI MONITORS, THEY LIKED WHAT THEY SAW.

"One 19-inch unit, the SuperScan Elite 751, distinguished itself from the others... great test scores"

PC Magazine

"SuperScan Elite 751 led the pack... delivers the same high-end image quality expected of the manufacturer... 1997 Product of the Year"

Imaging

"The best image available... SuperScan Elite 751"

Computer Shopper

"SuperScan Pro 800 is a true bargain... solid scores... terrific price"

PC Computing

"Our top 21-inch monitor... SuperScan Elite 802 had the best image quality... and its price is low"

Byte

"The Elite 802's image is solid in all respects, all the way up to 1800 x 1440 ... excellent performance at a reasonable price"

Cadalyst

"Best buy... SuperScan Pro 500 displays razor sharp text and graphics... very crisp text detail, accurate color graphics quality... terrific low price"

PC World

When you're looking for a monitor, pay attention to what you hear as well as what you see. Because the pros – people who test monitors for a living – like the new Hitachi SuperScans. They've been very clear in saying so.

They like SuperScan's clean, sharp images and accurate color detail. The fact is Hitachi has always been strong in high-end, big screen displays. Today, our 17 and 15 inch displays (various viewable image sizes) are winning solid acclaim as well.

So whatever size monitor you're looking for, listen to the pros and check out the new Hitachi's. Call for the full story and the location of your nearest retailer.

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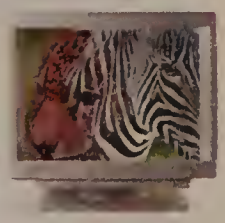

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3D WinBench '98 Performance†

VELOCITY 128	**670**
3D Blaster Voodoo2	656
Viper V330	530
XPERT@Play	444
70 Millennium II	

- 128-bit 2D/3D multimedia accelerator
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- 230MHz integrated RAMDAC
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PC WORLD

TOP 10 MONITORS

	15-INCH MONITORS	Month tested	Street price (3/13/98)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Samsung SyncMaster 500b 800/933-4110 www.sosimple.com	Dec 97	$229	86	very good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** $71 price drop, fine picture, very high refresh rate, sleek contemporary design, easy to adjust. **CON:** Crude on-screen menu icons.	636
2	Mitsubishi Diamond Scan 15VX 800/843-2515 www.mitsubishi-display.com	Oct 97	$299	85	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] image correction utility, three-year warranty, 12-hour weekday toll-free support. **PRO:** $51 price drop, terrific text and highly detailed graphics, high refresh rate, plain-English menus. **CON:** No tilt control.	637
3	Goldstar StudioWorks 57i 800/243-0000 www.lgeus.com	Dec 97	$230	84	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** $50 price drop; fine image quality; high refresh rate; well-designed, easy-to-adjust controls. **CON:** Boxy appearance.	638
4	CLR Vision Pro 15 800/611-1555 www.clrusa.com	Feb 98	$239	84	very good/ very good	**FEATURES:** 13.4-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 12-hour weekday toll-free support. **PRO:** Sharp text and realistic graphics, inexpensive. **CON:** Fairly crude on-screen menu icons, small viewable area.	639
5	Nokia 449Xaplus 800/296-6542 www.nokia.com	Feb 98	$329	84	very good/ very good	**FEATURES:** 13.5-inch viewable area, .25mm stripe pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. **PRO:** $50 price drop, crisp text and bright graphics, very adjustable, mike and speakers. **CON:** Small viewable area, second-highest price.	640
6	Max Tech XT-5862 800/936-7629 www.maxcorp.com	Dec 97	$185	84	very good/ very good	**FEATURES:** 13.9-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 8-hour weekday toll-free support. **PRO:** Dirt cheap, sharp picture, high refresh rate. **CON:** Fairly clumsy controls with no on-screen display and no degauss button, shortest support hours on chart.	641
7	Philips 105 B 800/835-3506 www.philipsmonitors.com	Feb 98	$249	84	very good/ good	**FEATURES:** 13.4-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 10-hour weekday toll-free support. **PRO:** $100 price cut puts monitor onto chart, built-in mike and speakers. **CON:** Awkward power switch, small viewable area, undistinguished graphics.	642
8	Panasonic PanaSync Pro P15 800/742-8086 www.panasonic.com/alive	Oct 97	$349	83	very good/ excellent	**FEATURES:** 14-inch viewable area, .27mm dot pitch tube, up to 75-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** Unusually crisp text and best color graphics, large viewable area, easy-to-adjust on-screen controls. **CON:** Most expensive on chart, no tilt control, generic appearance.	643
9	Princeton EO500 800/747-6249 www.prgr.com	NEW	$299	83	very good/ very good	**FEATURES:** 13.6-inch viewable area, .28mm dot pitch tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 24-hour weekday toll-free support. **PRO:** Sharp, clear text; very high refresh rate; nicely sculpted bezel. **CON:** Higher-than-average price, relatively small viewable area.	644
10	MAG InnoVision DJ530 800/827-3998 www.maginnovision.com	Dec 97	$288	82	very good/ very good	**FEATURES:** 13.8-inch viewable area, .28mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support (automated for 12 hours after 5 p.m.). **PRO:** Sharp text and graphics, easy to adjust, long support hours. **CON:** Somewhat pricey, awkwardly placed power switch.	645

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors. All products: 903

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 800 by 600 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

PRICES OF 15-INCH MONITORS take a nosedive this month. With a sizable $71 cut, Samsung's SyncMaster 500b becomes our number one Best Buy. Dropping $51, Mitsubishi's Diamond Scan 15VX moves up a notch into second place. Only one new monitor tested this month makes the chart—Princeton Graphic Systems' EO500. New models from Continental, CTX, NEC, Sony, and TeleVideo fell short of the Top 10. ■

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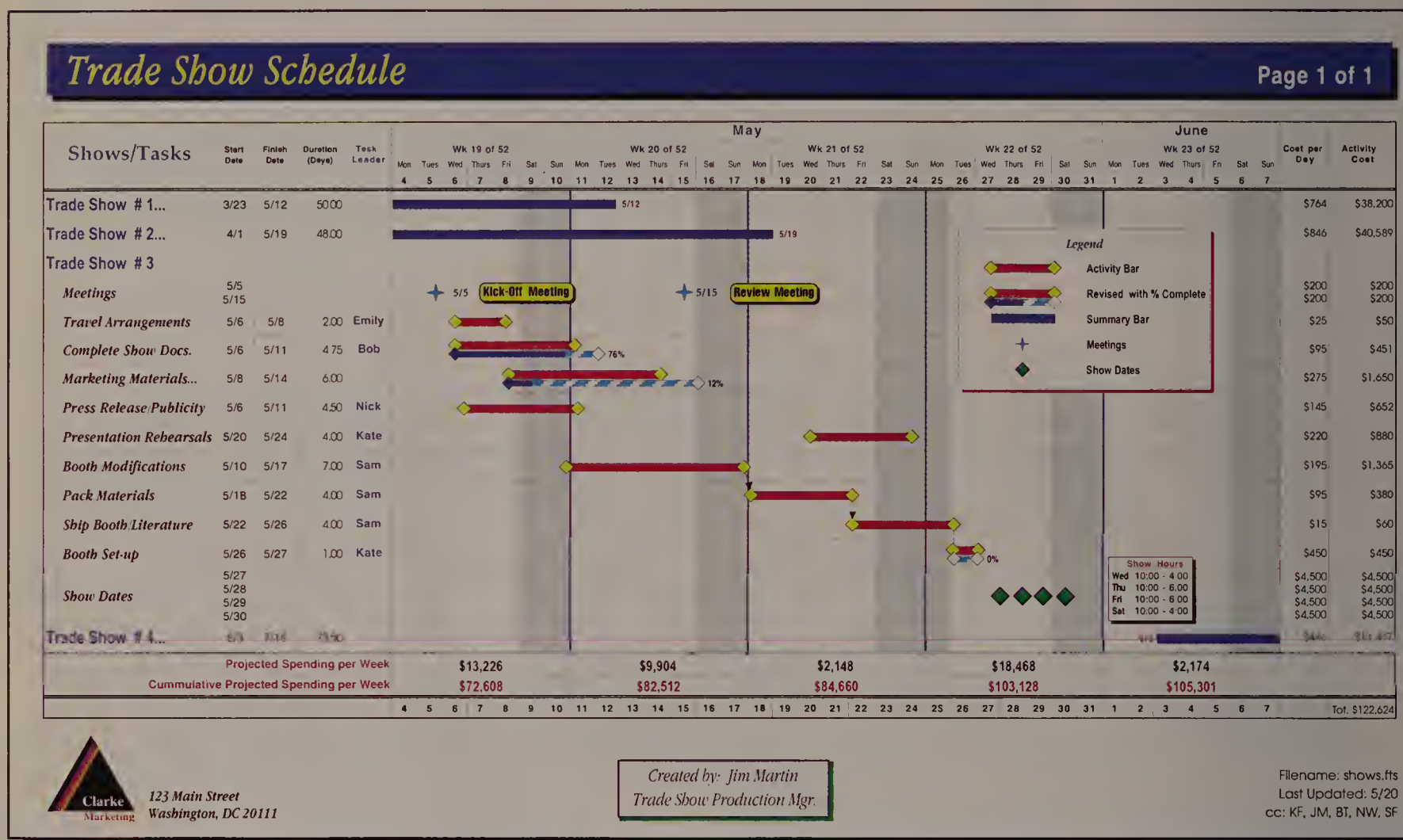

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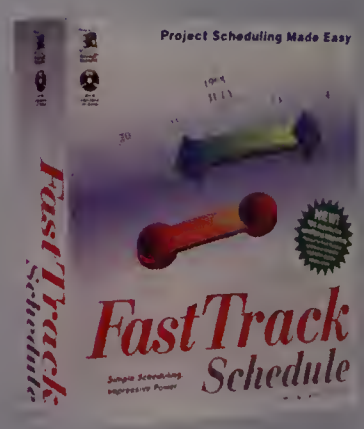

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PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (3/30/98)	Overall rating	PC WorldBench graphics score/ rating	3D rating	Multimedia rating	Comments	Reader service number
1	ATI 3D Pro Turbo PC2TV 905/882-2600 www.atitech.com	Oct 97	$219	96	189/ very good	good	outstanding	FEATURES: 8M8 of SGRAM, 200-MHz RAMDAC, ATI Rage II chip, software for 3D modeling, image editing, and VRML. PRO: Terrific multimedia performance, nice 3D, connects to a TV. CON: Expensive, mediocre video playback, no toll-free support.	630
2	ATI Xpert@Work 905/882-2600 www.atitech.com	Dec 97	$139	95	191/ outstanding	good	good	FEATURES: 4MB of SGRAM (upgradable to 8M8), 230-MHz RAMDAC, ATI Rage Pro chip, bundled photo editing and 3D modeling software. PRO: Fast all around, great utilities, connects to a TV. CON: So-so 3D image quality, no toll-free support.	631
3	Hercules Thriller 3D 800/532-0600 www.hercules.com	Mar 98	$129	94	188/ very good	very good	poor	FEATURES: 4MB of SGRAM, 230-MHz RAMDAC, Rendition Verite V2200 chip, no software. PRO: Good price, above-average 3D and decent 2D performance, toll-free support. CON: Slow in AVI video playback, no weekend support.	632
4	STB Velocity 128 800/234-4334 www.stb.com	Nov 97	$149	93	189/ very good	very good	adequate	FEATURES: 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games and 3D image editing software. PRO: $30 price drop, excellent 3D image quality, strong 2D performance. CON: Poor AVI video playback.	633
5	STB Nitro 3D 800/234-4334 www.stb.com	Dec 97	$99	92	190/ outstanding	adequate	adequate	FEATURES: 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/VX chip, bundled 3D games. PRO: Inexpensive board with speedy 2D performance, toll-free support, lifetime warranty. CON: 3D image quality is below average.	634
6	ATI 3D Xpression+ PC2TV 905/882-2600 www.atitech.com	Oct 97	$115	92	190/ outstanding	adequate	adequate	FEATURES: 4M8 of SGRAM, 170-MHz RAMDAC, ATI Rage II chip, bundled 3D games plus 3D modeling, image editing, and VRML software. PRO: Good 2D, speedy 3D, nice bargain, connects to a TV. CON: Mediocre video playback, no toll-free support.	635
7	Hercules Terminator 3D/DX 800/532-0600 www.hercules.com	Oct 97	$89	91	189/ very good	adequate	very good	FEATURES: 4M8 of EDO DRAM, 170-MHz RAMDAC, S3 Virge/DX chip, bundled 3D games. PRO: $20 price cut, quick in multimedia programs, excellent AVI video playback, toll-free support. CON: Subpar 3D quality overall, driver bug in Terracide game.	636
8	Hercules Dynamite 3D/GL 800/532-0600 www.hercules.com	May 98	$159	90	192/ outstanding	good	adequate	FEATURES: 4MB of SGRAM, 250-MHz RAMDAC, 3Dlabs Permedia 2 chip, bundled games and image editing software. PRO: $26 price drop, good 3D and 2D performance, toll-free support. CON: Disorganized utilities, choppy AVI video playback.	637
9	Hercules Stingray 128/3D 800/532-0600 www.hercules.com	Oct 97	$185	90	184/ very good	very good	poor	FEATURES: 4M8 of EDO DRAM, 180-MHz RAMDAC, Alliance ProMotion-AT3D chip, 3Dfx Voodoo Rush 3D chip set, bundled games. PRO: Terrific 3D image quality, toll-free technical support, $24 price cut. CON: Slowest 2D performance on chart.	638
10	Diamond Viper V330 800/468-5846 www.diamondmm.com	Dec 97	$170	88	190/ outstanding	good	good	FEATURES: 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games, photo editing and image editing software. PRO: Good overall 3D performance, top-notch 2D, easy install. CON: No toll-free support, mixed bag on image quality.	639

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 904

HOW WE TEST We tested PCI boards under Windows 95 with PC World8ench 1.0 at 800 by 600 resolution and 16.8 million colors, at 1024 by 768 and 65,536 colors (reported here), and at 1280 by 1024 and 65,536 colors. The 3D score is based on frame rates in our VRML and 3D game tests and on subjective ratings in three games. The multimedia rating is based on frame rates in our Macromedia Director and AVI playback tests, and on timed scores in our PowerPoint multimedia presentation tests. 8oards were tested in a Dell Dimension XPS P133c with 32MB of EDO DRAM and 256KB of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

AN OLD FAMILIAR board has departed our charts this month. The Diamond Stealth 3D 2000 Pro, which used to be sold with 4MB of RAM and TV-out capabilities, is now sold at retail only as a low-end upgradable 2MB board without TV features. But Diamond hasn't disappeared from our charts entirely: Slithering into the last-place position, the Viper V330 (based on the NVidia Riva 128 chip) has a good balance of 2D and 3D performance. ■

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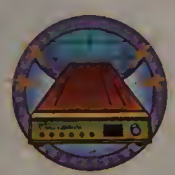
TOP 10 MODEMS

	EXTERNAL MODEMS	Month tested	Street price (3/26/97)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	3Com U.S. Robotics 56K Faxmodem External 800/342-5877 www.3com.com	retested this month	$180	80	2:43/2:54 [1]	**FEATURES:** 56 kbps (supports x2 and V.90), distinctive ring, manual volume control, Caller ID, RapidComm software. **PRO:** Fast 56-kbps downloads, long warranty, voice-enabled model on April's chart discontinued for upcoming V.90 upgrade. **CON:** A little pricey, slowest at 33.6-kbps performance, support call is on your dime.	694
2	Zoom FaxModem 56Kx 800/631-3116 www.zoomtel.com	retested this month	$139	79	2:35/3:12 [1]	**FEATURES:** 56 kbps (supports K56flex), MNP-10, distinctive ring, COMit and WinFax Lite software. **PRO:** Speedy at 33.6 kbps, support hours include Saturday, free upgrade to V.90 56-kbps standard even if modem swap required. **CON:** New firmware doesn't improve performance, no security features like Caller ID.	695
3	Shark Multimedia Leopard XT-56K External Speakerphone 800/800-3321 www.sharkmm.com	Feb 98	$110	78	2:34/3:08 [1]	**FEATURES:** 56 kbps (supports K56flex), distinctive ring, voice mail, speakerphone, VoiceView, ASVD, manual volume control, serial cable, Caller ID, DialTone software. **PRO:** Fast at 33.6 kbps, feature-packed, $10 price drop. **CON:** Short warranty, free upgrade to V.90 standard only if it can be performed through software.	696
4	Diamond Multimedia SupraExpress 56e 800/468-5846 www.diamondmm.com	Oct 97	$129	78	2:39/3:05 [1]	**FEATURES:** 56 kbps (supports K56flex), V.80 videoconferencing support, serial cable, COMit and FaxTalk software. **PRO:** Affordable, long support hours including Saturday, $11 price cut. **CON:** Serial cable is not detachable, free upgrade to V.90 56-kbps standard only if it can be performed through software.	697
5	Archtek SmartLink 5634RS 888/912-9800 www.archtek.com	Dec 97	$129	77	2:40/3:14 [1]	**FEATURES:** 56 kbps (supports K56flex), MNP-10EC, V.80, distinctive ring, voice mail, speakerphone, VoiceView, ASVD, Caller ID, QuickLink Message Center software. **PRO:** Inexpensive, free upgrade to V.90 standard even if modem swap required. **CON:** Slow 56-kbps downloads, technical documentation, short warranty.	698
6	E-Tech Cyber Bullet 56K External Fax/Modem with Speakerphone 888/609-8885 www.e-tech.com	Apr 98	$149	77	2:42/3:13 [1]	**FEATURES:** 56 kbps (supports K56flex), V.80, distinctive ring, voice mail, speakerphone, ASVD, serial cable, earphones, SuperVoice software. **PRO:** Lots of features, toll-free support. **CON:** A bit sluggish on 56-kbps tests, subpar documentation, free upgrade to V.90 standard only if it can be performed through software.	699
7	Microcom OfficePorte Voice 33.6 800/822-8224 www.microcom.com	May 97	$106	76	2:44	**FEATURES:** 33.6 kbps, MNP-10EC, distinctive ring, voice mail, ASVD, built-in microphone, serial cable, Focal Point fax/data software. **PRO:** Nice extras including a serial cable, cross-ship modem replacement, $14 price drop. **CON:** Heavy-handed documentation, no security features such as Caller ID.	700
	PC CARD MODEMS						
1	IBM 56K Cellular-capable PC Card Modem 800/772-2227 www.ibm.com	NEW	$249	81	2:27/2:55 [1]	**FEATURES:** 56 kbps (supports x2), V.80 videoconferencing support, Caller ID, digital line voltage protection, RingCentral software. **PRO:** Splendid performance, round-the-clock toll-free support. **CON:** A bit pricey, free upgrade to V.90 56-kbps standard only if it can be performed through software.	–
2	TDK CyberExpress 5600 800/999-4835 www.tdksystems.com	NEW	$159	80	2:34/3:09 [1]	**FEATURES:** 56 kbps (supports K56flex), MNP-10, distinctive ring, voice mail, Caller ID, digital line voltage protection, QuickLink Message Center software. **PRO:** Full-featured, nicely priced. **CON:** No cross-ship modem replacement, free upgrade to V.90 56-kbps standard only if it can be performed through software.	701
3	3Com Megahertz 56K Global PC Card Modem 800/638-3266 www.3com.com	NEW	$269	79	2:33/3:07 [1]	**FEATURES:** 56 kbps (supports x2), digital line voltage protection, RapidComm software. **PRO:** Good performer, able to connect at international locations, long warranty, free upgrade to V.90 56-kbps standard even if modem swap required. **CON:** Most expensive on chart, very few extras.	702

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 905

HOW WE TEST We test 33.6-kbps modem-to-modem performance using a pair of identical modems on a Telecomm Analysis Systems simulated phone network. It sends a text file over 55 line conditions, and a mix of four files—graphics, text, program, and compressed files—over one line condition. For our 56-kbps tests, we call a local Internet service provider access number and transfer .jpg, .doc, and .zip files continuously over an 18-hour period. The times to transfer a megabyte of data are higher in the ISP test than in the TAS test because the files used in the former are less compressible. Results for the two tests are not comparable. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. [1] V.34 TAS transfers/56-kbps ISP downloads.



3COM'S $180 U.S. Robotics 56K grabs the external modem Best Buy title. It's the first modem we've tested that supports the V.90 standard and a fine interim choice if you can't wait until fall, when the V.90 standards war will be resolved. (For details on V.90, see "First V.90 Modems: Good News and Bad" in *Top of the News*). Meanwhile, IBM's 56K Cellular-capable modem—the fastest unit here—is the Best Buy on our newly reinstated PC Card list. ■

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DIGITAL PHOTOGRAPHY

A Clearer Picture Develops

AN EASY WAY TO PUT A DARKROOM ON YOUR DESKTOP

Rapid-fire technology advances and falling prices are combining to make digital photography mainstream for businesses and consumers alike

WHETHER YOU TAKE photos to preserve memories of families and friends or to help your business grow, digital cameras and photo-quality printers give you plenty of reasons to smile.

Today's digital cameras offer higher resolution—up to 1,280 x 1,024 in the Olympus D600L. As resolution and image quality increase, prices drop. Cameras now average just $700 and many cost less than $400. And only digital cameras offer such pioneering features as the rotating lens and flash assembly in the AGFA ePhoto 1280 and Nikon's voice annotation and touchscreen menus. These innovations are just a few of the timesaving conveniences you can expect in digital cameras but not in traditional point-and-shoot film cameras.

DIGITAL DELIVERS

Initially, digital cameras appealed primarily to casual photographers because of their timesaving features. As image quality increased, however, consumers and businesses both came to appreciate the added convenience and control that digital imaging delivered. With a camera, photo-quality printer, and editing software, you can now control the photo shoot from concept to printout.

Peter Bergman, vice president of marketing and customer care at Canon, one of the largest manufacturers of cameras and peripherals, explains that digital imaging benefits users in the following ways:

Affordability. There are no film costs or processing expenses (paper, chemicals, or darkroom hardware). As an added bonus, if you don't like the image, you can erase and retake it immediately.

Flexibility. You can post your photos on a Web site, send them as E-mail, embed product photos in mail-

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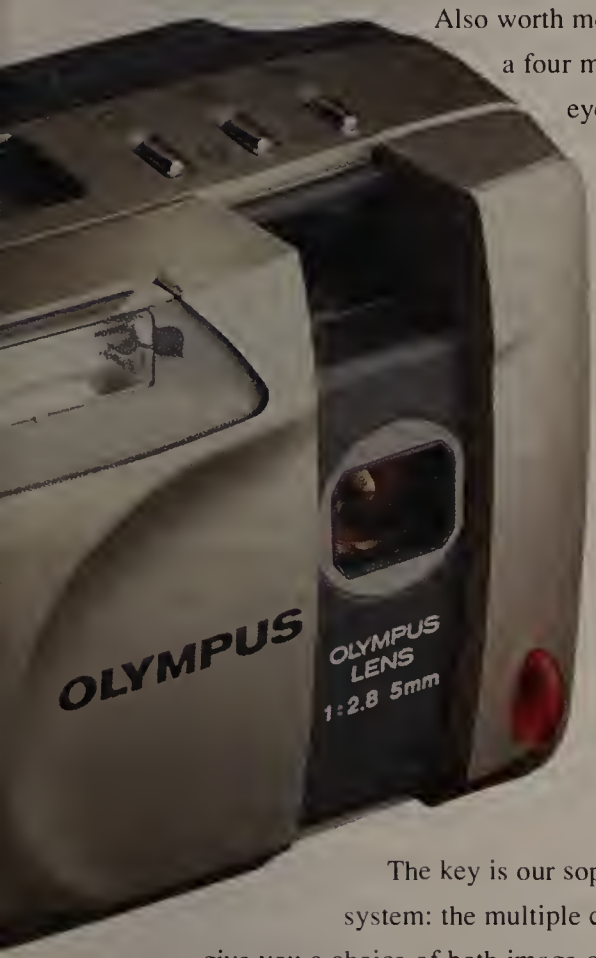
WAY OUT FRONT

Let's begin with the optics that give Olympus its renown. Here the D-320L exceeds beyond all counts. It has a five element all glass aspherical F2.8 autofocus lens with macro. Quite simply, this lens is equal to the lenses on our award-winning 35mm cameras. Put another way, this digital camera consistently produces higher quality images than other digital cameras, even some with higher resolution.



Also worth mentioning: a four mode flash with red-eye reduction; auto white balancing; and manual exposure controls.

WE WORK OUR PIXELS HARDER THAN ANYONE ELSE

Our resolution: never produce a high resolution camera without giving the pixels something to do. Our resolution is 1024 x 768 pixels and all 810,000 of them have plenty to keep them occupied.

The key is our sophisticated imaging system: the multiple compression ratios that give you a choice of both image quality and size as well as the color management system that rewards you with rich, vibrant images. The result: every one of our pixels earn their keep.

SHOOT, SHOOT, SHOOT

There are no restrictions on the number of photos you can capture with the D-320L. The 2 megabyte SmartMedia™ card that comes with the camera (4 or 8MB optional) has an unlimited capacity. You just simply download the images from the card to your computer by means of the serial cable or the optional PCMCIA or 3.5" floppy disk adapters. Or you can insert a new card anytime and keep on shooting.

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The new FlashPath adapter lets you download images and transfer large files directly to any Windows® computer via its standard 3.5 inch floppy drive. Simply remove the SmartMedia memory card from the D-320L, slip it into the FlashPath adapter and insert it into the 3.5 inch floppy drive. In seconds, your images can be transferred to your PC.

NO COMPUTER NECESSARY

Hook up the D-320L to the TV and watch your shots come to life.

For those who don't want to be married to a computer day after day, there's emancipation. The D-320L has video output that directly hooks to your TV. The entire family can now view your shots without the need for a computer. And the images can be videotaped on a VCR and sent to relatives or business associates.

Another direct connection is from the camera to the new Olympus P-300 personal photo printer. In a little over a minute you can print true photo quality images directly from the camera. Finally, digital independence!

Connect the camera to our photo printer and presto! Get the photo you want, when you want it.

OUR REVEALING BACK

It tells you a lot. For one thing, there's the new 2" screen that displays real images in brilliant color. You can use it as a viewfinder or to review your shots one at a time or nine at a time. Or use it to present a slide show by automatically displaying each image one at a time. And if stop action inspires you, the D-320L can capture 9 shots per second in a single frame.

A FINAL BYTE

So purchase a new D-320L Digital Camera by June 30, 1998 and get a FlashPath Floppy Disk Adapter for free. And start enjoying downloading high resolution camera images with floppy disk convenience. For more information on Olympus Digital Products visit us at www.olympus.com/digital. Or call us at 1-800-622-6372 and we'll answer all your questions.

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DIGITAL PHOTOGRAPHY

ers, faxes, and newspaper ads, or send prints to friends and family.

Control. With digital cameras and image-editing software, you can resize, rotate, cut and paste, or re-color images to achieve precisely the look you want.

Duplication. Copy your photos with no degradation of quality. Each copy duplicates the original perfectly.

Ease of use. There is no need for an enlarger or chemicals. You have the benefits of a darkroom on your desktop without the mess, hazards, or cost of a darkroom.

Immediacy. Snap a photo and view it instantly on the camera's LCD screen. Upload it into your computer for editing or printing and have that picture now—no waiting. TWAIN drivers simplify and standardize the uploading of images from a variety of digital imaging devices to a computer.

Whether they're used for business or pleasure, digital cameras tap into the human desire to look at pictures.

Casio's QV-5000SX digital camera carries an estimated street price of $599 and features a 1.3 million-pixel CCD.

same quality optics in a digital camera as in a first-rate film camera: top-quality multi-element lenses that deliver clear, high-resolution images; deeply saturated colors; and rich, vivid images—qualities that snapshot takers have come to expect only in 35mm cameras. In addition to improved image quality, the newer digital cameras offer such convenient features as a zoom lens, auto focusing, auto exposure plus LED, and optical viewfinders.

Humans are visually oriented. We want the instant gratification that comes from viewing, printing, or transmitting those images immediately.

Indeed, Kristi Holch, an analyst with InfoTrends Research Group in Boston, sees human nature as a driving force behind the development of this technology. "Digital photography is part of a cultural change toward using more images in our lives and in our work space," she says. "Humans are visually oriented. We want the instant gratification that comes from viewing, printing, or transmitting those images immediately."

BRIGHT COLORS, VIVID IMAGES

Digital imaging technology continues to close the once-significant gap between the quality of digital imaging and that of film media.

Consumers can expect to find the

Instead of film, most digital cameras use light-sensitive chips called charged-coupled devices, or CCDs, which can approximate the quality of film-based cameras for many uses. For example, Alexis Gerard, publisher of the "Future Image Report" in Burlingame, Calif., sees the digital image replacing traditional photography in publishing and catalogs, as well as in the insurance and real estate industries.

Using new CCD production techniques, Sony and Texas Instruments have produced increasingly more accurate, yet smaller, CCDs. What does this mean to the user? Brighter colors, lower prices, and lighter cameras. Thanks to the new generation of chips, today's high-quality digital cameras can produce a 1.2 million-pixel image with 24-bit color depth, sharp enough for most home and business uses.

SMART STORAGE

Today's digital photos store their images on a variety of removable media including PC cards, floppy disks, and "SmartMedia" flash-memory cards. Thanks to improved compression techniques, flash-memory cards no larger than a postage stamp hold dozens of digital images. Sony's Digital Mavica uses standard 3.5-inch diskettes, making it the leader in cost-effective storage. Images stored on standard magnetic media last for several years. Stored on an optical disk, they last up to 100 years.

When you're ready to view the images, you simply upload them into your computer. No computer? No Problem! Just connect your camera directly to one of the new low-cost photo-quality printers.

Photo-quality printers provide sharp, color-rich prints without chemicals or long waits. True-color, smoothly blended prints, once available only from dye-sublimation printers that cost thousands of dollars, are now available, thanks to miniaturization and modifications to the critical thermal print head and improvements in dye chemistry.

For less-critical applications, color ink jets from Epson, Canon, and Hewlett-Packard, using special inks and high-quality paper, can produce near-photo-quality prints at a 1,200 and 1,440 dot-per-inch resolution.

Of course, the key to achieving acceptable results with integrated digital imaging is matching your components to assure that they work efficient-

Continues ▸

Building a Desktop Darkroom

A digital camera is just the first component of a desktop darkroom. Color printers, storage devices, and photo-editing software will give you the top-quality results you want.

PRINTERS

You can multiply the benefits and conveniences of a digital camera with an affordable color printer. Select from two types of photo-quality printers: high-resolution color ink jet and dye sublimation.

Today's new color ink-jet printers far exceed the clarity and image quality offered by their predecessors, and at a lower cost. Prices for photo-quality ink-jet printers range from $400 to $800. For those prices, you receive print resolutions ranging from 600 to 1,440 dots per inch, up to four-page-per-minute print speeds in color (or about seven pages per minute in monochrome), and separate black and color cartridges. If you do most of your printing in monochrome, purchase a printer that offers separate cartridges—it will save you many times the difference in cost over time.

Dye-sublimation photo printers provide the highest quality output. However, dye-sub printers operate much more slowly, typically at speeds of less than a page per minute. And they cost more to operate than ink jets, so they are not suitable for routine printing operations. For example, the cost of "expendables," which include the dye-sublimation ribbon and special paper, can range up to $1 per 3- x 5-inch or 4- x 6-inch photo.

Typical dye-sublimation printer prices range from $350 to $500. Olympus's $399 P300 lets you print 1,024 x 1,276 in 24-bit color. Sony's $500 DPP-M55 prints 640 x 480, but includes a convenient infrared port. If you want to print directly from the camera, make sure you get a model that accepts the camera's output, as does the Olympus.

STORAGE OPTIONS

Digital cameras make photo taking so easy and inexpensive that you run the risk of taking so many photos that you'll outstrip your storage space. Since you use most of the photos only occasionally, you would be better off storing them separately, not on your hard drive.

One of your options is Iomega Corp.'s Clik! portable storage device. At just 2 x 2 inches, Clik! holds 40 MB worth of digital images, and in a form factor you can carry in your pocket. The Clik! removable, reusable disks are half the size of a credit card.

Recordable CD-ROMs let you store up to 650 MB worth of memories or marketing aides on a single CD. A CD-ROM "burner" will cost about $400. Rewritable models, as the name implies, let you erase and re-record the images. They cost about $600. Optical storage drives provide another alternative. Rewritable optical drives can store up to 2.6 GB on a single disk, offer a mind-boggling 100-year media stability life, and sell for about $400.

The Olympus P-300 Personal Photo Printer yields high-quality prints from Olympus cameras in one minute, with or without a computer.

Kingston Technology's line of flash memory products come in capacities ranging from 2 MB to 20 MB, all with solid-state design and very low energy consumption. Kingston's DataPak hard drive can store a whopping 540 MB of digital images.

SOFTWARE

If you work with digital photographs for use on a Web site or in print, you will need photo-editing software. Web designers can use easy-to-learn and live-with software such as ArcSoft's Photo Studio or Ulead's Photo Impact. Camera and printer vendors often include these utilities with their hardware.

Professional photographers and graphic designers will want finer control, such as the ability to tint, color-match, and expertly retouch photos. Most casual users will never need the high-end features available in such packages as Adobe's high-end PhotoShop and will not want to climb its steep learning curve.

ly with one another. Vendors of integrated systems components, such as Olympus, design their cameras, photo scanners, image-editing software, and printers to work together seamlessly so all of the components are perfectly color-matched and calibrated. That means the rich red you capture in the camera's LCD will match the red you see in the print.

DIGITAL IMAGING MEANS BUSINESS

Should you buy digital imaging products? That depends on how high a value you place on your time. In business, saving time means saving money.

"Digital imaging is already replacing traditional photography in the professional market," says Steve Hoffenberg of Digital Photography Systems Advisory Service at Lyra Research. "At the Summer Olympics in Atlanta and the Winter Olympics in Japan, press photographers used digital cameras to send photographs directly to the wire services, getting them there hours ahead of photographers who used film."

At the Olympics, photographers who used digital cameras to send photographs to the wire services got them there hours ahead of photographers who used film.

Hoffenberg sees many real estate companies using digital photography. "They can place photos of homes for sale online within minutes of taking a new listing," he says. Daniel Gouge, co-owner of Spectrum Properties, a real estate company in Oceanside, Calif., follows that advice. He takes photos with his Kodak digital camera and posts them on Spectrum Properties' Web site. "We can capture images of a property today and mount it on the Web tomorrow," explains Gouge.

Spectrum catalogs all images in a permanent database that allows the company to reuse the images in newspaper ads and flyers. Gouge credits the digital images, combined with the detailed listing information on Spectrum's Web site, with attracting buyers from across the U.S. and Canada.

FOR BUSINESS AND PLEASURE

Digital photo integration is not only for the private entrepreneur. The Boone County Fiscal Court in Burlington, Ky., uses the technology to create a virtual tour of the historic courthouse. Tim Kazior, information service manager for the courthouse, says the technology's flexibility amazes him. Using software-editing tools such as PhotoEnchancer and Kai's Power Goo, Kazior creates everything from straight slides to fanciful abstracts. "The images we get are astounding, beyond our expectations," he says. "People are beginning to see the power of digital photography."

One user who integrates not only images but business, pleasure, and family is John Fitzgerald (John Fitzgerald Photography, **www.win.net/~nofilm**) of Louisville, Ky. He converted his love of horseracing into an online event. At the Kentucky Derby, he captures the racing action on the track for Internet Sports, a leading Internet sports-reporting agency. Between races, he captures the excitement of the Derby's colorful carnival atmosphere by photographing the multicolored hot-air balloons, steamboat races, and parades. At day's end he posts them on the official Derby Web site for immediate viewing.

Digital imaging has also made a difference for dog breeder Janet Johnston of Tartan Westies (**www.tartan@onramp113.org**) in Winter, Calif. For several years, Johnston has photographed her West Highland White Terriers and sent professional-quality prints to friends and other breeders around the world. With her new digital camera set-up, "I don't have to buy film, take it to the developer, and worry about and wait for a good picture," explains Johnston. "I snap the picture, take the camera to the computer, view the results, and print them out on my Canon printer. I love the convenience, and I am super-impressed with the quality."

Agfa's ePhoto 1280 camera offers photo-quality images and a swivel-zoom lens for under $1,000.

Integrated digital imaging can make a difference in your life. Perhaps you'll want to use it to capture for all time the smiles at a family gathering, a child's graduation from kindergarten, a baby's first frowns; you can easily post them on a Web site in a photo album or print them into a personalized picture postcard. Or perhaps your goal is profit—then use the images in your business, adding impact to a sales pitch or a printed document, taking a picture of someone else's dream home (or a dented fender), or helping customers better see what you sell. The only boundaries are those imposed by your imagination; as high as your imagination can soar, digital imaging will carry you there. ■

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The Telephone Always Rings Twice

WHEN THE GOOD GUY in a Hollywood thriller is under the gun, he usually turns to someone gorgeous and says, "Hold all my calls." This is a signal that the action is heating up: Someone is going to get snared, shot, or seduced. And those calls get held—that is, unless a call comes in from the president. A good secretary knows better than to send the president to voice mail.

I want my life to be like that. I'm not going to pack an Uzi, wear a wire, or ride shotgun next to Bruce Willis (sigh), but I can decide when my workload is heating up enough to announce, "Hold all my calls (except the important ones)." Since I can't afford a flesh-and-blood assistant, I'm hiring a digital secretary. Fortunately, lots of hardware and software gizmos use Caller ID or distinctive ring to screen my calls, interrupt me only for important ones, and help me keep track of people and their phone numbers—all the things a good secretary in the movies does.

Hiring an assistant is an important step, so I interviewed four plastic and silicon applicants. I wanted a device that wouldn't ask me to change the way I work or require much hand-holding. It'd be nice if it made coffee, too, but as this was the nineties, I didn't hold out much hope.

EDITED BY
Angela Freeman, Anne Kandra, and Scott Spanbauer

ILLUSTRATION: GORDON STUDER

SORRY, WRONG NUMBER

THE FIRST APPLICANT, 01 Communiqué Laboratory's $99 **Communicate 8.0**, is simply a software package. But it claimed that by using my voice modem, it could turn my computer into a communications command center.

I loaded the software and found myself looking at a virtual phone that seemingly did everything. When phone calls came in, it popped up the callers' name or phone number on my computer screen, sent the ones I wanted to avoid directly to voice mail, and even played a message I'd recorded specifically for a certain person. If, say, my editor phoned, I could decide to talk to her, have Communicate take a message for me, or play a canned recording telling her I was working on a deadline and not taking calls—even if I was really napping.

The program can even send and receive faxes and e-mail (though that would have meant using its e-mail in-box and folders with my existing Internet account, something I wasn't willing to do). And it has an unlimited number of password-protected voice mailboxes—handy if your home office has a staff of minions or you just have lots of personalities. (Communicate Pro 2.0, which should be available by the time you read this, will add even more features, including pager dispatching and Internet phone calling.)

One particularly cool feature: Communicate let me record a voice mail message and deliver it at a later time. Great for giving my editor the idea that I worked till 3 in the morning! Communicate didn't get the job, though. For one thing, I ultimately found the interface slow and awk- ▶

ward. I could never remember, for example, that I was supposed to hit the Power button to quit the program. The sound quality wasn't very good, either. It sped up my outgoing message so I sounded as if I'd had 16 cups of coffee instead of the usual 3. And it had a nasty tendency to crash my system. In short, it was too eager. I'm not hiring anyone who wants to remake my work habits.

IT BARKS, IT SCREAMS: The Mitel phone is fun to work with, but its database is a drag.

MITEL, MY SWEET

MY NEXT APPOINTMENT was with the **Mitel Personal Assistant**. This $349 device looks like an ordinary business phone, but it relies heavily on the computer to get its work done. Personal Assistant wasn't willing to work 24 hours a day (unless I planned to leave my computer on constantly), but what secretary is?

This assistant was fun to work with. It can turn the ordinary ring of a phone into just about any sound, depending on who's calling. My computer barked like a seal when my husband called, screamed when my mother rang, and ordered "Answer the phone" when my editor checked in.

The Personal Assistant also did an admirable job of capturing phone numbers to my PC and keeping track of who called. Whenever someone phoned, it would check their number and bring up their information on my computer screen. And, of course, Mitel offered to dial the phone for me or forward calls to another number.

Unfortunately the Mitel insists on using its own database of callers, a feature I found awkward. I can import my address book files and later export them back to my PIM, but what a pain! I don't want to maintain two databases of phone numbers, and I'm not willing to switch to Mitel's software. Another problem—the Mitel occupied one serial port, a precious commodity in my office. Fortunately, a USB version of the phone should be available by the time you read this.

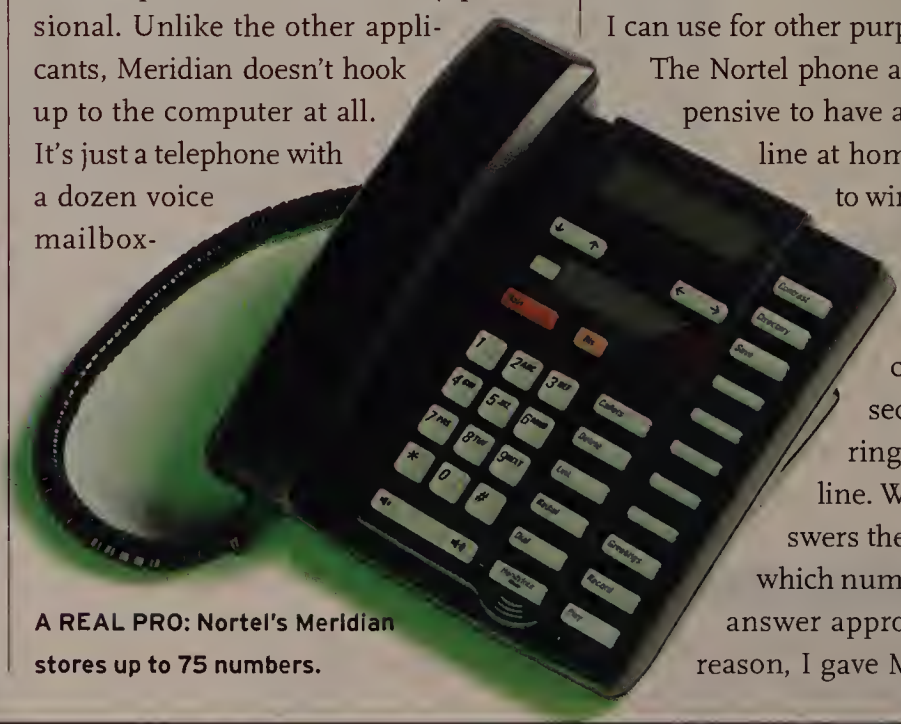
The Mitel Personal Assistant has all the features I was looking for and was an amusing workmate. But ultimately I found it a little too demanding. I didn't hire the Mitel, but it was certainly on the shortlist. (I forwarded its résumé to a friend of mine who works in sales.)

LIVE AND LET DIAL

THEN CAME THE $249 **Nortel Meridian 9516CW** phone: smart and very professional. Unlike the other applicants, Meridian doesn't hook up to the computer at all. It's just a telephone with a dozen voice mailboxes. That makes the Meridian a better call as a receptionist than as a personal assistant.

Meridian is easy to set up, works independently, and doesn't take up much space, but its job skills are limited. When a call comes in, I see the phone number of the caller (and their name if I've programmed it in) on its LCD. Or I can have the phone announce out loud who's calling—either by phone number or by name (if I record it). If I don't want to take the call, Meridian will answer it using the standard message that I've recorded, an alternate message, or a personal message intended only for that caller. It can keep a directory of up to 75 names and numbers, but it can't capture them in a database on my computer that I can use for other purposes.

The Nortel phone also makes it inexpensive to have a second business line at home without having to wire a new line. Simply sign up for distinctive ring with the phone company to get a second number that rings on your current line. When Meridian answers the phone, it'll know which number is ringing and answer appropriately. For this reason, I gave Meridian a job ▶



A REAL PRO: Nortel's Meridian stores up to 75 numbers.

Scorecard

Communicate 8.0
Grade: **C**; Price: $99 list; 01 Communiqué Laboratory; 800/668-2185, 905/795-2888; www.01com.com
READER SERVICE NO. 720

Mitel Personal Assistant
Grade: **B**; Price: $349 list; Mitel; 800/648-3579; www.mitel.com
READER SERVICE NO. 721

Nortel Meridian 9516CW
Grade: **A**; Price: $249 list; Northern Telcom; 800/466-7835; www.nortel.com/phones
READER SERVICE NO. 722

YoYo Call Manager
Grade: **A**; Price: $120 list; Big Island Communication; 650/237-0350; www.big-island.com
READER SERVICE NO. 723

F Y I

MOST AVID home PC users aren't tech-savvy Gen-Xers. A new study says that PC owners ages 55 and older spend an average of 38 hours a week at the keyboard—67 percent more time than people between 18 and 24.

SOURCE: MEDIA METRIX

PHOTOGRAPHS: KEN SMITH; ILLUSTRATION: MARK MATCHO

Three things your mouse can't do:

ROLL OVER!

SPEAK!

LISTEN!

It's time to find a more faithful companion for your PC: **the Philips SpeechMike.™** This revolutionary input device contains a trackball, microphone and speaker—all in one ergonomically designed handheld device. With SpeechMike, you're no longer chained to the keyboard—you don't even need a flat surface to work on. And that just might leave your old mouse in the doghouse. Find out more about SpeechMike on-line at: **WWW.SPEECHMIKE.PHILIPS.COM** or call 1-888-SPEECH-4.

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DIAL AND ERROR: Communicate's phonelike interface looks cool enough, but it's too difficult to work with.

answering the telephone in my house, but I kept on interviewing for a secretary that would do more.

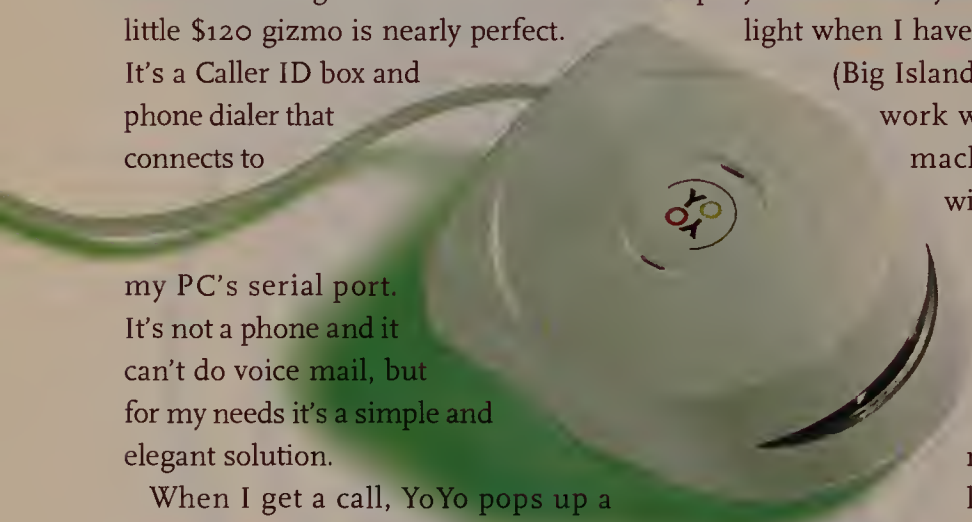
MY GIZMO FRIDAY

WELL, I'M HAPPY to be able to offer **YoYo Call Manager** a full-time position in my home office. Big Island Communication's little $120 gizmo is nearly perfect. It's a Caller ID box and phone dialer that connects to my PC's serial port. It's not a phone and it can't do voice mail, but for my needs it's a simple and elegant solution.

When I get a call, YoYo pops up a diminutive window on my desktop telling me who's calling. If the computer isn't turned on, it holds the Caller ID information and zaps it to my PC the next time I power up. YoYo also emits sounds that tell me what type of call is coming in—say, a long-distance call—in case I'm screening calls but not sitting at the computer. I can even tell YoYo which numbers it should send to my pager when someone important phones. Now, whenever I'm out of the office and my son's day-care center calls, my pager notifies me.

YoYo artfully captures phone numbers: I just click one button, type the person's name, and the caller info is forever captured to YoYo's database. Better yet, YoYo works with some off-the-shelf PIMs—I tried it with Sidekick 98, and everything meshed. I'm so impressed with this feature, I'm thinking about switching to Sidekick just so I can take advantage of it. Big Island claims YoYo operates well with other TAPI-compliant PIMs, too, like Day-Timer, Act, and Microsoft Outlook.

YoYo doesn't even attempt voice mail, but it works nicely with my phone company's voice mail system. It even blinks a light when I have messages waiting. (Big Island says it would also work with an answering machine.) That's okay with me. I don't like having to turn on my computer just to listen to messages. Unfortunately this also means that I can't leave any personalized outgoing messages for the people who call me. I'm a little sad about that. Mitel's Personal Assistant and I had fun toying with the minds of my friends and relatives.



LOOK MA: YOYO identifies callers and stores the info on your PC.

FULLY STAFFED

AFTER AN ARDUOUS recruiting campaign and lots of time-consuming interviews, I can finally get back to work. The Nortel Meridian and YoYo have turned out nicely: I'm spared the drudgery of tracking down phone numbers, and I'll never have to dial a number again. Best of all, when the phone rings, I don't have to answer it—even if it is the president on line one.

Christina Wood is a contributing editor for PC World. ■

F Y I

DO YOU USUALLY feel sluggish and cranky on Mondays? Well, so does the World Wide Web. According to a new report, Monday is the worst day of the week for average Internet server provider throughput and call reliability.

SOURCE: INVERSE NETWORK TECHNOLOGY

KEEPING UP

Dad, Can I Borrow the PC?

BREAKNECK CURVES, squealing brakes, terrified passengers—I remember my high-school driving lessons like they were yesterday. Too bad I couldn't take Driver's Education '98 for a spin before I hit the asphalt. It can't replace real time on the road, but Sierra's $40 CD-ROM mixes arcade-style graphics with practical instruction on the rules of the road, defensive driving, and the fine art of parallel parking. Got a teenager who's eyeing a learner's permit? Consider the disc a form of auto insurance. Visit www.sierra.com/titles/driversed for more information.

A Free Look at Outlook

YOU MIGHT LOVE IT, you might hate it, but you probably won't be on the fence about Microsoft's new Outlook 98 personal information manager. While it's bursting with innovative features, its unorthodox interface can be tough to master. But for now, Outlook has one feature with universal appeal: It's free from Microsoft's Web site (www.microsoft.com/outlook). That's quite a deal, considering that the same software retails for $109. To avoid a big 15MB download, you can order a CD-ROM version from the site for $9.95. The free-for-all ends June 30, except for owners of Office 97 and Outlook 97.

Exciting Advice

WHAT DO UNIVERSITIES, dogs, and used cars have in common? Choosing any of them is a life-altering decision that requires a lot of thought. For assistance, try Excite's DecisionMaker (www.excite.personalogic.com). You answer a series of multiple-choice questions, and DecisionMaker suggests schools, breeds, or models. (It can also help select bicycles and cruises.) The site's no substitute for thorough research and careful contemplation, but many of its recommendations seem sensible; when I sought car advice, the '96 Saturn I already own was among the top two picks.

—Harry McCracken

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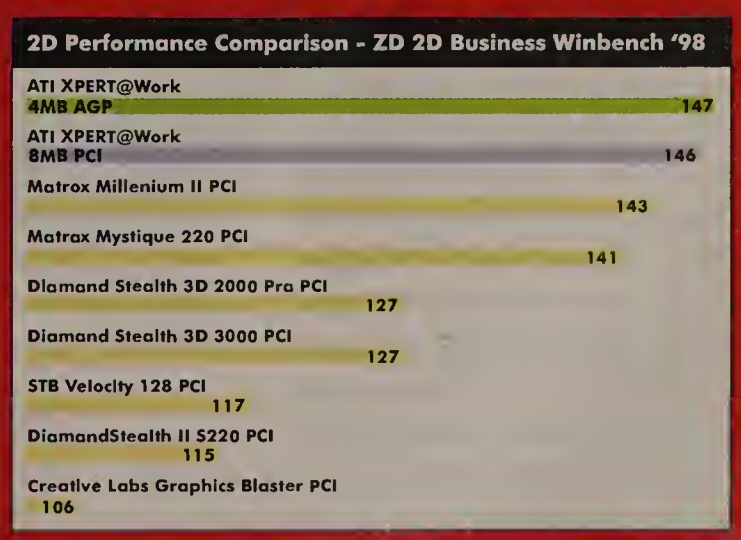

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Unclog Your Net Access for Fast Relief

EVER HEAR OF the MTU? Nope, it's not the Boston subway or the music video channel. It's an obscure setting in Windows 95's Registry, known mostly to people who use pocket protectors.

But don't let that put you off. Tweaking the MTU (Maximum Transmission Unit) can double—and in some cases even triple—the throughput of your Internet access in less than five minutes. And for an unbelievable price: free.

How does it work? Prepare for a little geekspeak. Data shoots across the Internet and into your computer in packets. The packets are sized for optimal transfer speed over Internet backbones, routers, and ethernet networks. But if you're connected through a modem and an Internet service provider, this default packet size is less than optimal. The result? A substantial performance hit because the packets are fragmented and need to be reassembled.

Naturally, I'm going to point my finger at Microsoft. The computer giant obviously wasn't paying attention when it set the MTU default to 1500 in the Windows 95 Registry. Lower that number to 576, and your throughput will increase substantially. This MTU fix is almost as good as squirting some WD-40 into the back of your modem. (*PC World*'s lawyers warned me to say I was just kidding about the WD-40. Kids, please don't try this at home.) Even Microsoft has admitted that the change is useful and has repaired the problem in Windows 98.

Don't doubt that changing the MTU makes a huge—no, humongous—difference. In a Bass Laboratory blind study, I changed the setting on my wife's system without telling her. Touching her machine is risky (fortunately, I'm insured against spousal computing disasters), but this particular death-defying act paid off. She asked if I had changed ISPs or had done something to her machine, because her favorite Internet sites seemed to be—and I quote—"coming on-screen lots quicker than usual." Ta-da!

The MTU fix is almost as good as **squirting** some **WD-40** into the back of your **modem.**

THE BIG FIX

YOU DON'T NEED to wait for Windows 98 to fix your MTU speed. With nothing more than Windows 95's RegEdit, a free tool that's probably already on your hard drive, you can make the change in a few minutes. (Except, of course, for my Mom. Please, Mom, don't fiddle with the Registry, okay? I'll do it for you the next time we're over for dinner.)

But don't mess with the Registry just yet. First, back it up with Microsoft's free Configuration Backup utility. That way, if you wreck your system somehow or screw anything up, you can always restore the old settings. You already have a copy of Configuration Backup—it's on your Win 95 CD-ROM in the Other\Misc\Cfgback directory. If you can't find the disc, download the program from www.fileworld.com, part of PC World Online.

If you're Registry savvy, you'll find that there's nothing to it. Use RegEdit's Find feature to search for MaxMTU, pressing **<F3>** to repeat the search if necessary. Once there, right-click on *MaxMTU* in the right pane, choose *Modify*, and change the Value Data to **576**. Then close the registry, reboot the system, and get ready to fly.

PRESTO CHANGE-O

IF REGEDIT CAN'T find a MaxMTU setting—or if you feel at all confused—don't worry. You can download one of several great MTU presto–change-o utilities in minutes. All of these will make the MTU setting changes for you, and they're available at www.fileworld.com.

The easiest of the programs to use—and the one I recommend—is PPP-Boost (www.c3sys.demon.co.uk). It's free, and the interface takes no special skill to use. If you want to do some extra tweaking, try Mike Sutherland's $10 MTU-Speed Pro 4.10 (ws4.u-net.net/~mjs/mtuspeed.htm). Finally, for a mere $15, you can try Patterson Design Systems' TweakDUN 2.0 (www.pattersondesigns.com/tweakdun), the only program in this excellent trio that includes built-in help.

The technical details on MTU are available on what I consider the premier MTU site, NetPro NorthWest's Techfile at www.snsaccess.com/~netpro/maxmtu.htm.

Okay, that's the scoop on MTU. Now it's your turn. Tell me your Internet speedup tricks at steve_bass@pcworld.com.

online *You'll find files from this article at www.fileworld.com. Contributing Editor Steve Bass is a licensed marriage and family therapist and the president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 14 for more information).* ■

ILLUSTRATION: MARK MATCHO

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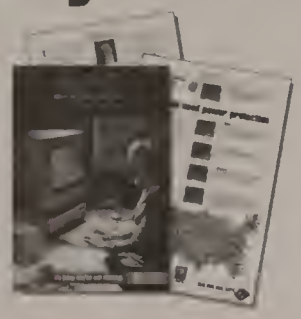

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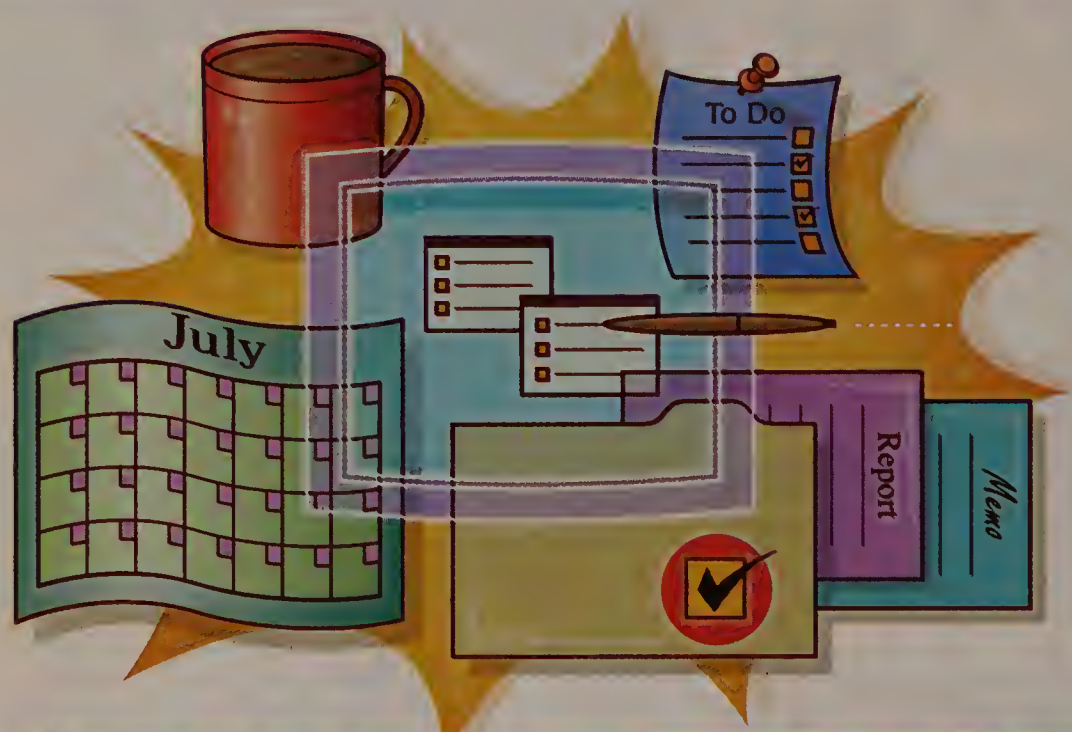


WINDOWS TIPS

Give Your Active Desktop a More Active Role

WINDOWS' NEW ACTIVE DESKTOP—which is included with Internet Explorer 4.0 and also with the upcoming Windows 98—is not just for the Web-connected. By creating your own HTML file with various form fields and saving it as Windows wallpaper, you can change your Windows desktop into a scratch pad, a blotter, a daily to-do list, or a holding tank for any miscellaneous material you may want to keep temporarily in a convenient location.

Here's what to do. Choose *Start•Programs•Internet Explorer•FrontPage Express.* Now get creative—color the text and background (choose *Format•Background* and select colors from the Background and Text lists), type in some text, and format it as you please (use the drop-down lists and buttons on the Format toolbar).

To add areas for desktop typing, use the Forms toolbar. For a single-line box, click the *One-Line Text Box* button on the left of the Forms toolbar. Or for a larger box, click the *Scrolling Text Box* button. To resize a text box, select it and drag its handles. Once it's the right size, you can duplicate it by selecting it, holding down **<Ctrl>**, and dragging the copy to another location.

If you have trouble positioning items, consider inserting them into a table. Start by dragging the *Insert Table* button on the Standard toolbar (choose *View•Standard Toolbar* if you don't see it) until it displays the appropriate number of rows and columns. When it does, release the mouse button. If you have items that you want to move into the table, just select each item and drag it to the desired cell. Select commands on the Table menu to add to the table (*Insert Rows or Columns*), combine two or more selected cells into a single cell (*Merge Cells*), convert single cells into several (*Split Cells*), or adjust the table's colors, alignment, and cell margins or padding (*Table Properties*).

Finally, add some finishing touches: The *Check Box* button on the Forms toolbar inserts a convenient tool for checking off items on your desktop agenda. And if you need an eye-catching daily reminder, consider using a scrolling marquee (choose *Insert•Marquee,* select formatting options, and click *OK*).

When you're done, choose *File•Save* or *File•Save As* and click *As File.* Navigate to the Wallpaper folder (usually Windows\Web\Wallpaper) and click *Save.* Then exit FrontPage Express and right-click the Desktop. Select *Active Desktop•Customize my Desktop.* Click the *Web* tab and make sure *View my Active Desktop as a Web page* is checked. Then click the *Background* tab and select your Internet document from the list. Click *OK.* You can now jot down any notes or agenda items you need for the day on your desktop (see **FIGURE 1**).

If you turn off your computer nightly, your desktop form will be a clean slate each time you turn on your PC. Since the notes aren't preserved, you'll need a permanent way to store important information. Also, Active Desktop boggles some PCs; if you see strange new problems, revert to your passive-but-problem-free existence.

By Scott Dunn

ILLUSTRATION: JEFFREY PELO

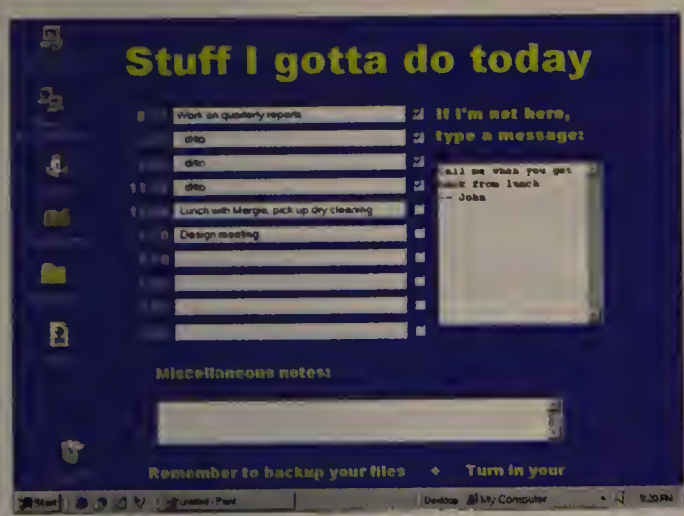


FIGURE 1: TURN YOUR DESKTOP into a scratch pad by adding HTML forms controls and saving it as a Web page.

RECOVER DELETED FILES

98 WE ALL MAKE mistakes. DOS 6.*x* gave us tools for undeleting files we accidentally blew away. But Windows 95 and 98 aren't so forgiving. They give us the Recycle Bin, figuring we won't empty it by mistake.

But what happens if you do? Is there any way out? If you upgraded to Windows 95 or 98 from DOS and still have your DOS undelete.exe utility, the answer is yes. Here's what to do.

1. The moment you discover that you've deleted a file you need, stop what you're doing. If you continue to use your hard disk, the file may disappear permanently.
2. Select *Start•Shut Down*. Click *Restart the computer in MS-DOS mode*, then click *Yes*.
3. When your PC restarts, navigate to the folder where the deleted file used to be.
4. To allow the undelete utility to access the disk directly, type **lock c:** (your drive letter may differ) and press **<Enter>**. Type **Y** and press **<Enter>** to acknowledge the scary message (but don't worry; we won't leave the disk locked for long).
5. Now type **undelete** and press **<Enter>**. Follow the prompts to restore your file.
6. When you have restored the file and are back at the DOS prompt, type **unlock c:** to prevent further direct disk access. Then type **exit** to return to Windows.

BETTER WAYS TO YOUR DESKTOP

98 THE DECEMBER Windows Toolbox highlighted two utilities for helping you get to your Windows 95 (or NT 4.0) desktop, or at least to the objects on it. A number of readers wrote to point out other solutions that require no software at all, saving you money and system resources.

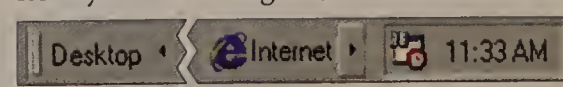
One clever idea comes from Doug Lloyd of Troy, Ohio. He recommends making a Shortcut to an Explorer window that shows all desktop files, Shortcuts, and system objects. To create this Shortcut, first right-click the *Start* button and choose *Open*. Then navigate to a folder where you want the Shortcut to reside—for example, Programs\StartUp if you want the Explorer window to open each time you start Windows. Next, right-click an empty area of the folder and choose *New•Shortcut*. In the Command Line box, type **Explorer /root,** (make sure you include both the space and the comma). Click *Next* and name the Shortcut **Desktop**. Then click *Finish*. The next time you need an item on your desktop, you can either launch your Desktop Shortcut from the Start menu, or (if the Desktop Explorer is already running) hold down **<Alt>** and press **<Tab>** repeatedly until you bring this Explorer window to the top.

If you prefer to clear away clutter by minimizing all your system's open Windows, you can right-click the taskbar and choose *Minimize All Windows*. But Alex Fabrikant of Arcadia, California, notes that if your keyboard includes the <Windows> key, you can get the same results a little faster by holding down the **<Windows>** key and pressing **M**.

FIGURE 2: POSITION THE taskbar at the screen edge.

For users of Windows 98 or Internet Explorer 4.0, Ty Cooper of Arlington, Virginia, suggests clicking the new *Show Desktop* button on the taskbar. To restore the open windows to their previous sizes, just click the button again.

In Windows 98 and IE 4, you have still another option: Right-click the taskbar and choose *Toolbars•Desktop* to display your desktop objects on a portion of the taskbar, as in the figure below. (If Desktop is already checked, don't select it or it will turn the toolbar off.) If you don't see the item you're looking for, hold the mouse



button down on the arrows at either end of the taskbar to scroll, or drag the left end to enlarge the Desktop toolbar.

To eliminate the need for scrolling (in most cases), move the taskbar to the left or right edge of the screen, as in **FIGURE 2**. Just position the pointer over an empty area of the taskbar and drag it to any screen edge. Make sure your pointer is over the taskbar (not one of its toolbars); a safe place is near the Start button or near the buttons that correspond to currently running applications.

For maximum accessibility, right-click the taskbar, choose *Properties*, click ▶

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Always on top, and click *OK*. Finally, right-click this (or other taskbar toolbars), and choose *View•Small* or *View•Large* to make sure you have the icon size you want.

GIVE WINDOWS APPLICATIONS PRIORITY

IF YOU'VE RELEGATED DOS to a few file management chores and batch files, you can ensure your Windows applications get the most attention from your PC's processor. Just start Control Panel and double-click the *386 Enhanced* icon (or the *Enhanced* icon in Windows for Workgroups). In the Scheduling section of the dialog box, check *Exclusive in Foreground* (see **FIGURE 3**). This causes Windows to ignore DOS applications that are running in the background. (But note that this setting can cause problems when running Windows on a system using Novell NetWare Lite 1.1.)

If you want to give DOS applications in the background relatively little attention, leave this box unchecked and increase the value for Windows in Foreground to a maximum of 10000. To adjust the priority Windows applications receive in the background (when a DOS program is in the foreground), change the Windows in Background setting. Click *OK*.

If you are using Windows for Workgroups 3.11 on a network, note that considerable processing time may be going to shared resources if other users are connected to your PC. To give yourself processing priority (at the expense of connected users), double-click the *Network* icon in Control Panel, and then click the *Startup* button at the bottom of the dialog box. In the Performance Priority section, drag the slider to the left (toward Applications Run Fastest).

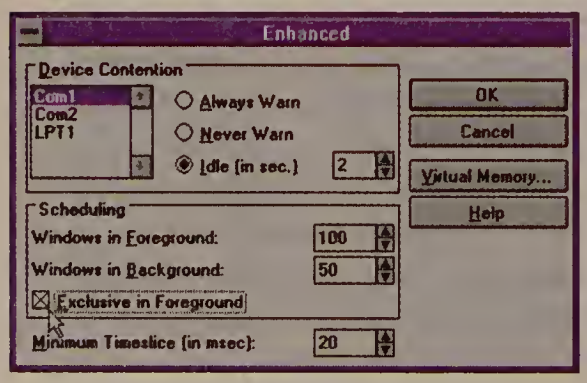


FIGURE 3: GIVE MORE POWER to your Windows applications by ignoring inactive DOS programs.

SORT YOUR DISK DRIVES IN WINDOWS NT

YOU'VE JUST INSTALLED a third hard drive, and when you start Windows NT, you notice something strange: Your new drive is D: and your former D: drive is now E:. The result is that none of the applications on your E: drive work anymore—Windows expects them to be on D:. What should you do?

Fortunately, Windows NT comes with a tool to deal with this situation. Choose *Start•Programs•Administrative Tools (Common)•Disk Administrator*. Click one of the partitions whose drive letters you want to change. Choose *Tools•Assign Drive Letter*. Select a drive letter from the 'Assign drive letter' drop-down list. You can't choose a drive letter that is already assigned, so for this step pick any letter that isn't used. Click *OK*, then click *Yes* to acknowledge that the change will happen immediately.

Now select the second partition, and follow the same steps to assign this partition the desired letter.

Finally, select the first partition again and change it to its final drive letter. In the example above, you would first change the E: drive to F: (or another unassigned drive letter), then change D: to E:, and finally change F: to D:. This tip works for hard drive partitions and CD-ROMs but not for removable media such as Iomega Zip or Jaz drives nor recordable CD-ROM drives.

DON'T GET ME STARTED!

I AM TIRED OF just about every program loading a mini-icon on the system tray. Testing shows some of them reduce system resources by approximately 2 percent. How do I get rid of them?

Glenn MacRill, Houston

IT ISN'T THE PRESENCE of the icons on the tray that is taking up system resources, but the running of their applications. You may want to shut some of these down when you run a particularly memory-intensive program. Unfortunately, as you've discovered, there isn't a single standard way to exit an application whose only appearance on screen is its icon in the tray area.

Here are some things to try. First, if you decide you want a given utility running only occasionally, right-click the *Start* button, choose *Open* or *Explore*, navigate to the StartUp folder, and move the icon to a different folder within the Start menu folder. The next time you start your system, the utility won't run until you start it manually.

If you don't see the utility in your StartUp folder, open the win.ini file in Notepad (it's in your Windows folder) and look for lines beginning run= and load=. Copy the offending line, paste it on a new line, and type a semicolon at the beginning (the far left). This disables the copy but makes the disabling easy to undo if you change your mind. Now delete the name of your utility's .exe file from the original run= or load= line.

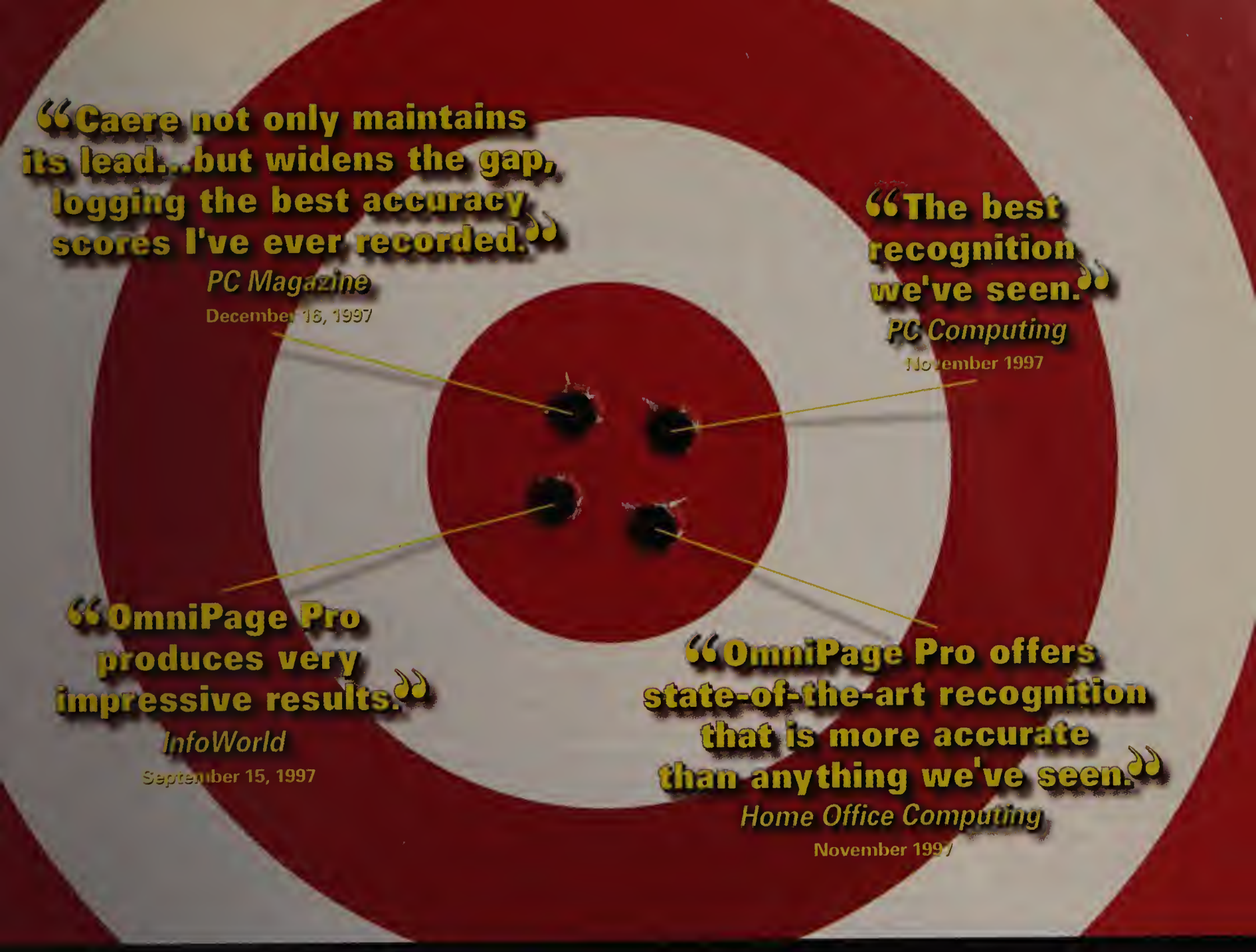
Some applications run right from the Windows Registry. In those cases, your best bet is to call the manufacturer.

If you like your utilities to run most of the time but want to exit one or more of them on occasion, try this: First, right-click or left-click an icon in the tray. Some utilities, such as Win 95's Resource Meter, will display a menu from which you can choose *Exit* or at least display a window from which you can exit the program, as in the figure below.

Other times you must choose the application's *Shortcut* icon from the Start menu as if you were starting it for the first time (select *Start•Programs•Start Up*). This will sometimes open the utility's main window, from which you can exit the application.

For really stubborn cases, try pressing **<Ctrl>-<Alt>-<Delete>** (just once) to open the Close Program dialog box. Select the application's name in the list and click *End Task*. This can be a bit confusing, since the list doesn't necessarily display the name you're used to. For example, to shut down Windows 95's System Agent, select *Sage*, then click *End Task*. To figure out which name you want, use the process of elimination.

Windows Tips *welcomes tips and questions and pays $50 for published items. Contributing Editor Scott Dunn is an author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■



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YOUR QUESTIONS ON: Parallel ports ◆ Backing up the Windows Registry

How Do You Boot From Your Emergency Disk?

YOU'RE ALWAYS TELLING us to have an emergency disk ready in case we can't boot from the hard drive. But what do we do with the boot disk if that ever happens? What are we looking for?

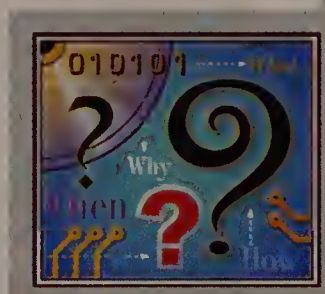
Scott Douglas, Tilden, Nebraska

BIG QUESTION: What should you do if Windows 95 refuses to boot?

The emergency boot disk that I always talk about is the Windows 95 Startup disk, which you can create from the Add/Remove Programs applet located on the Control Panel. You can create other, arguably better emergency boot disks with programs like Norton Utilities and Nuts & Bolts, but these aren't available to as many people. And besides, the basic rules are the same no matter which one you use.

After yelling and screaming awhile, boot from your emergency boot disk (if possible, avoid using one created on another PC, since it may not know about your system's unique settings). To do this, put the floppy in drive A: and either press your PC's reset button or turn your computer off and then on. In a little while, you should see an A:\> prompt on your screen. Congratulations—you're in DOS.

At the A:\> prompt, enter **dir c:**. If you get a list of files that you recognize from your hard drive, heave a sigh of relief: You haven't lost your data. Now it's time to try some of the programs on your Startup disk to see if they can help (see the figure at right). You can check your hard drive for errors with the command **scandisk c:**. If everything seems to be working, the command **sys c:** will copy to your hard drive the files needed to make it bootable again.



If you cannot read C: at all, you have a problem, but it's harder to tell what kind. It might just be a loose cable that you can replug after opening your computer. Or something may have wiped out the contents of your hard drive, in which case you'll have to repartition and reformat the darn thing (the programs fdisk and format are on the floppy for this dirty job). Or you may be faced with having to replace the physical drive.

If you feel nervous about undertaking any of these operations, consider having someone else look at your system before you do anything drastic. See "PC Won't Boot" (April, page 128) for more details.

If you do end up reformatting the hard drive, you'll want to reinstall Windows, and that's where the Startup disk falls down: It doesn't provide a way to read your CD-ROM drive. Neither do Norton's or Nuts & Bolts' emergency floppies. To make a boot floppy that can read your CD-ROM drive, see "Give CD-ROM Drive the Boot" (*Answer Line*, March).

Then it's a matter of resetting your defaults and reinstalling your applications—or restoring everything from a backup. Let's hope you can do the latter. ▶

Quick Fix for Touchy Typists

DOES YOUR KEYBOARD seem sluggish when you hold down an arrow key? Or maybe you litter your documents with typos because keys repeat so fast? If so, double-click the *Keyboard* icon in Windows' Control Panel. Drag the first slider to determine how long you must initially hold a key before it starts repeating. Drag the second slider to change the repeat speed. Click *OK*. (This may not work for a programmable keyboard.) With luck, you'll see a difference in your typing—or at least in your Tetris scores.

WHAT'S ON YOUR EMERGENCY BOOT DISK?

Program	Explanation
attrib	Lets you look at and change your files' attributes.
chkdsk	Older disk scanner. Ignore this one and use scandisk.
debug	Tool for editing data on a bit level. For hard-core nerds only.
edit	Text editor for changing config.sys, autoexec.bat, win.ini, and other text files.
fdisk	Partitions your drive, wiping out everything on it in the process. After the drive has been partitioned, it must be formatted.
format	Formats your hard drive (or any other disk), wiping out everything on it in the process.
regedit	Not the Windows program. Lets you restore backups of your Registry saved from within the Windows Regedit program.
scandisk	Inspects your disk for errors and optionally fixes them.
sys	Makes a drive bootable. Useful if you can't boot from C:.
uninstal	If you've installed Windows 95 over an earlier operating system, you can use this to uninstall it.

WHEN YOUR HARD DRIVE WON'T BOOT, your Windows Startup floppy disk probably will, and its programs can help you get back on track. Type a program name and /? for instructions.

ILLUSTRATIONS: JEFFREY PELO

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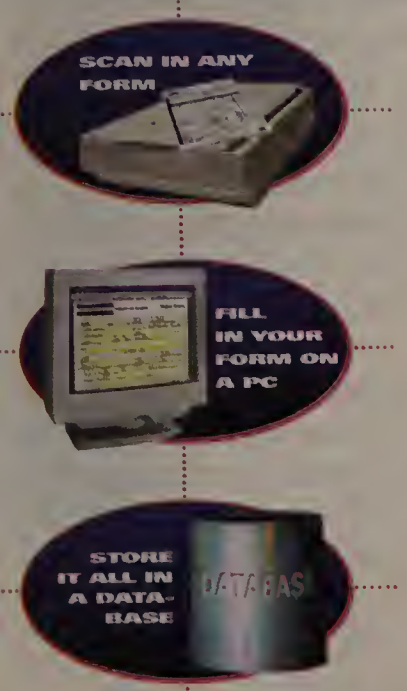

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EXCEPTION ERRORS: NOT ALWAYS MICROSOFT'S FAULT

YOUR INFORMATION on troubleshooting Windows 95 Fatal Exception Errors [*Answer Line*, August 1997] provided some valuable insight. But you didn't discuss hardware as a cause. Faulty memory and overheated systems cause many exception errors, particularly those that occur randomly.

Amin Ismail, Dayton, Ohio

THANKS FOR POINTING this out. Hardware is often the culprit. Still, I wouldn't recommend replacing your motherboard at the first sign of trouble. It's best to try the simplest and cheapest solution first. That could be a matter of updating a driver; or it might entail opening your computer, cleaning it out, and unplugging and replugging all the cards and connections.

As you point out, a random error is likelier to be hardware based—even if it first crops up when you upgrade your OS. Windows 95 and NT use memory differently than their 16-bit predecessors, and flaws that went unnoticed before can cause trouble in a 32-bit environment.

BETTER BALANCING ACT

IN "BALANCING SOUND in Windows 95" [March], you suggested a complicated way to get to the Volume Control dialog box. It's much easier to double-click the speaker icon in the system tray on the right of the taskbar.

Jerry A. Smith, Smyrna, Georgia

GOOD POINT, JERRY! I overlooked that shortcut because I long ago removed the speaker icon from my system tray.

GIVE CD-ROM DRIVE THE SLASH

IN STEP 5 OF "Give CD-ROM Drive the Boot" (March), I recommended shortening a config.sys statement when preparing a boot floppy that can read the CD-ROM drive. The trimmed statement should be 'device=nec_ide.sys /d:neccdo'.

PORTS: PARALLEL AND PERPENDICULAR

IN EXAMINING MY computer's BIOS settings, I saw an option to configure my parallel port as ECP, EPP, or normal. How do these choices differ?

Adrian Li, El Segundo, California

ECP AND EPP ARE enhanced (and compatible) versions of the standard (normal) parallel port. Each improves on a different shortcoming of the original. To my knowledge, all new computers carry ECP- and EPP-capable parallel ports.

Though the original parallel port is meant to send data to a printer, the Enhanced Parallel Port does a good job on inbound or outbound information. If you have an external drive, you'll want it attached to an EPP port. The Extended Capabilities Port's forte is speed. The port uses compression to transmit data in both directions at up to 2MB per second. This compression is particularly effective for dispatching graphics to a printer.

But there are a couple of good reasons not to change your settings to ECP. First, if your printer can't handle so fast a stream of information, ECP won't do you any good, and it might produce errors. Second, ECP uses an extra DMA channel, and you may not have one to spare.

REGISTRY WON'T FIT ON FLOPPY

I CAN'T COUNT HOW many times I've been told to back up my Registry files (user.dat and system.dat) to a floppy disk. But my system.dat file is larger than 1.44MB and cannot fit on a floppy disk. How do I overcome this obstacle?

Michael D'Nelly-Warady
Sunnyvale, California

SYSTEM.DAT RARELY FITS on a floppy. How could it? Every program in the world sticks garbage there. But hidden amongst the garbage is vital information Windows needs to know about your computer.

Backing up the Registry yourself is important, even if Windows backs it up for you (into system.dao and user ▶

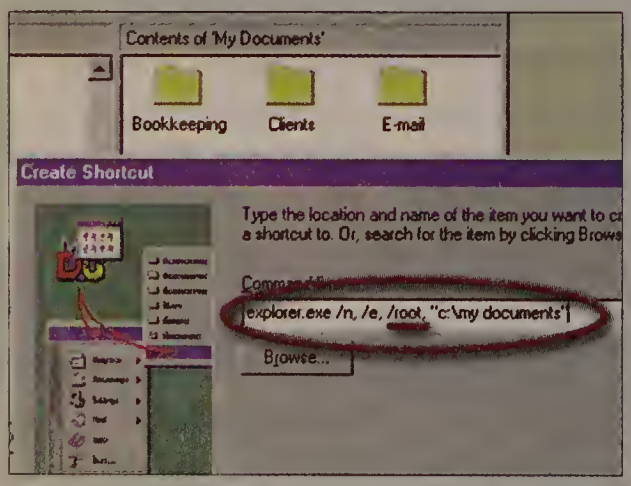
Open Explorer Directly Into a Folder

I LOVE Explore From Here, a nifty tool in Microsoft's PowerToys collection that lets me open Explorer directly into a particular folder, with nothing outside that folder even visible.

But you don't need PowerToys to enjoy this feature. You can create an Explore From Here Shortcut to any folder yourself.

First, right-click the desktop (or a folder where you want the Shortcut to take you) and select *New•Shortcut*. In the Create Shortcut Wizard's 'Command line' field, enter **explorer .exe /n, /e, /root, *path*,** where ***path*** identifies the folder you want to browse.

For instance, to go to your Word and Excel documents, you might type **explorer.exe /n, /e, /root, "c:\my documents"** (remember to enclose the path in quotation marks if it contains any spaces). Click *Next*, give the Shortcut a name, and click *Finish*.



Back Up Your Registry

IT'S A GOOD IDEA to keep a backup of your Registry on your hard drive before you attempt to make any potentially dangerous change. Here's how to do it:

First, open Windows Explorer. Select *View•Options*, and on the *View* tab select *Show all files*; then click *OK*. Create a folder named **c:\regback**. Navigate to the c:\Windows folder, and find the files system.dat and user.dat. Right-click and drag these files to another folder, selecting the *Copy Here* option from the pop-up menu.

Should you need to restore your Registry, shut down Windows, selecting the *Restart the computer in MS-DOS mode* option. At the c:\windows> prompt, enter the following commands, where *c:\regback* is the path to the folder containing your Registry backup:

```
attrib -s -h -r system.dat
attrib -s -h -r user.dat
attrib -s -h -r c:\regback\*.dat
copy c:\regback\*.dat
attrib +s +h +r system.dat
attrib +s +h +r user.dat
```

Enter Y in response to the two prompts you get after entering the copy command. Then reboot to Windows.

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The ScanMaker X6 is also loaded with other extras —the full-application of *Kai's Photo Soap* from *MetaCreations* for cleaning up your images, the full-application of *Ulead PhotoImpact 4.0* imaging software, *DocuMagix PaperMaster SEC* document management software, *Caere's OmniPage*™ *Limited Edition* OCR software for scanning text. The ScanMaker X6 also includes *PictureFun!* which links you to *PictureMall.com* where you can order prints, coffee mugs, business cards, mouse pads, apparel, and other items customized with your own scanned photos.

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.dao). The problem with Windows' own backup is that you can't control when it happens. If you change the Registry on Tuesday and realize on Thursday that it was a mistake, your change may already be in the *.dao files, making them useless for restoration.

To put your Registry onto a floppy, use a .zip-based compression program, such as PKZip for DOS. System.dat may be big, but it compresses quite nicely.

But backing up your Registry to a floppy isn't critical. When a program messes up your Registry (notice I didn't say *if*), the easiest thing to do is to exit Windows and replace user.dat and system.dat with older (but not too much older) copies. Copies on your hard drive will do just fine. (See "Back Up Your Registry" on the previous page for details on how to make and use Registry backups on your hard drive.)

Of course, if the contents of your hard drive visit a digital black hole, having a copy of the Registry on the drive won't help. But in that case, you'll have to restore everything from a tape backup, anyway—which should restore the Registry.

What? You don't have a tape backup? Then you'll have to reinstall Windows and all your apps, creating a new Registry.

• PKZip for DOS

$47 list; PKWare, 414/354-8699, www.pkware.com

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OFFICE 97 BLOCKS QUICK VIEW

WHY CAN'T I USE Quick View (the file viewing program accompanying Windows 95 and NT) in Word 97 and Excel 97? Does it have something to do with the new file formats? Is a fix available?

Cynthia Whalen, Toronto

YOU'RE RIGHT: It's the file formats. Microsoft licensed the Quick View technology from System Compatibility (afterward bought by Inso Corporation) when Windows 95 was in the design stage, but it has never updated the filters. Windows 98 should come with Office 97 filters.

If you don't want to wait, you can buy the complete version, Quick View Plus from Inso. This version supports the Office 97 file formats, in addition to several versions of WordPerfect, 1-2-3, Corel Draw, Paradox, and many other programs Microsoft would prefer you didn't use. And unlike the original, Quick View Plus lets you print and copy from the viewer.

Another option is to download Microsoft's own Word and Excel viewers from www.microsoft.com/office/viewers. These are just as good as Quick View Plus for Word and Excel files—and they're free.

• Quick View Plus

$59 list; Inso Corp., 800/733-5799, www.inso.com

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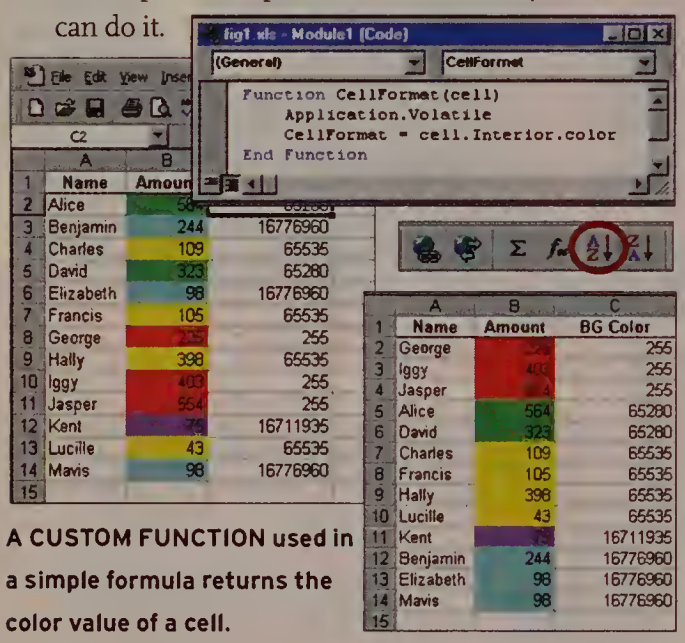
SPIRE

Create a Custom Function to Sort by Cell Formats

IS IT POSSIBLE to sort a range of cells based on the cell's formatting? In my Excel worksheet, I color-code various cells in a range by changing their background color. I would like to be able to sort the range by these background colors, so cells of the same color are together.

Ross McLain, Kentwood, Michigan

I DON'T KNOW OF any spreadsheet that allows sorting by cell formatting. But with the help of a simple custom function, you can do it.



A CUSTOM FUNCTION used in a simple formula returns the color value of a cell.

Creating the function involves inserting a Visual Basic module into your workbook, then using that function in worksheet formulas. Here's what to do:

1. In Excel 97, select *Tools•Macro•Visual Basic Editor*, then select *Insert•Module* and enter the VBA code shown below and in the figure above. (If you're using Excel 5 or Excel 95, select *Insert•Macro•Module*.)

```
Function CellFormat (cell)
    Application.Volatile
    CellFormat = cell.Interior.color
End Function
```

This function returns the color value of a cell's background. Select *File•Close and Return to Microsoft Excel*. In earlier versions of Excel, just click the tab to return to your worksheet.

2. Next, insert a column of formulas containing this function. For example, to create the left side of the figure, I entered the following formula in C2 and copied it to C3:C14:

=CellFormat(B2)

The formulas in column C return the color value of each cell in column B.

3. Sort your data by the column that contains the CellFormat formulas. To get the results shown in the figure, place the pointer anywhere in column C and click the *Sort Ascending* button.

If you use Excel 97's new conditional formatting feature, the function will always return the value of the cell's original background color, regardless of what's displayed.

You can modify the CellFormat function to return other types of formatting data too, but you'll need to know a bit about the VBA properties first. For example, to sort by Bold formatting, change the second statement in the function to:

```
CellFormat = cell.Font.bold
```

After you make this change, the CellFormat function will return True or False.

MERGING VS. CENTERING ACROSS SELECTION

I USE EXCEL 97 at home and Excel 95 at the office. I noticed that Excel 95's Center Across Columns button is labeled Merge and Center in Excel 97, and it produces a different effect. Can I still center across a selection in Excel 97?

Stan Comber, Edinburgh, Scotland

CLICKING EXCEL 97's Merge and Center button actually performs two operations: It merges the selected cells into a single larger cell, and it horizontally centers the data or text that was in the upper left cell in the merged cell.

You can't return this button to its former functionality, but you can still center across a selection: Highlight the cells you want to center, select *Format•Cells*, click the *Alignment* tab, select *Center Across Selection* from the Horizontal drop-down box, and deselect the *Merge cells* box.

Spreadsheets welcomes your questions and tips and pays $50 for published items. Contributing Editor John Walkenbach is the author of nearly two dozen spreadsheet books, and maintains The Spreadsheet Page (www.j-walk.com/ss). See page 14 for contact information. ■

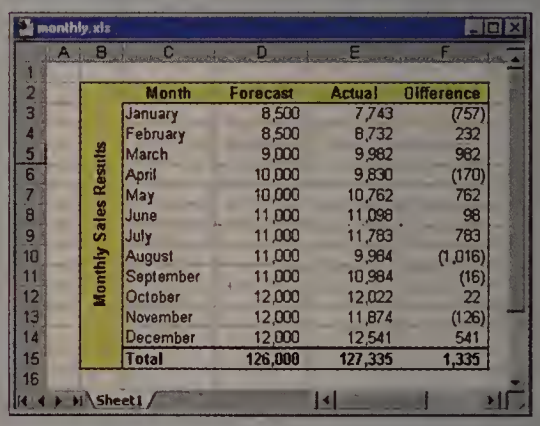
The Keys to Dialog Boxes

WHEN YOU'RE WORKING IN a dialog box, you may find that it's more efficient to keep your hands on the keyboard than to repeatedly switch back and forth between keyboard and mouse.

To move among dialog box controls without using the mouse, press **<Tab>** and **<Shift>-<Tab>**, or press **<Alt>** plus the underlined letter of a specific control to activate it. You can also use the spacebar to toggle option buttons and checkboxes on and off.

More on Cell Merging in Excel 97

MERGING CELLS is new to Excel 97, and it can be a little tricky. All the cells in the range to be merged must be empty except the one in the upper left corner. If the other cells contain data, copy them to the upper-leftmost cell before you perform the merge.



The figure shows how merged cells can be used to create a vertical label. The cells in B2:B15 are merged into one cell. The label, which is in cell B2, is displayed across the entire merged cell range. I also changed the text orientation (select *Format•Cells*, select *Center* in both the Horizontal and Vertical lists, set the orientation to *90* degrees, and check *Merge cells*).

ILLUSTRATION: JEFFREY PELO

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Paste wordy Word tables into Excel ◆ Wrap WordPerfect text around an image

Read Documents Easily With Automatic Scrolling

IF YOU'RE PRINTING all your Word documents rather than reading them on screen, you're wasting paper. But pressing <Page Down> or clicking the scrollbar repeatedly to review a document is a pain.

If you have one of Microsoft's slick IntelliMouse devices, you can scroll by moving the thumbwheel. But even if your mouse is only ordinary, an undocumented command in Word 97 can automatically scroll a document for you, letting you adjust the speed to suit your needs. Here's how to take advantage of this cool feature:

1. With the document loaded in Word, select *Tools•Macro•Macros* from the menu.
2. In the Macros dialog box, first select *Word Commands* from the 'Macros in' list, then choose the *AutoScroll* option from the 'Macro name' list, and finally click *Run*.
3. To control scrolling speed and direction, position the hourglass pointer over the vertical scrollbar. Move it to the top half of the scrollbar to scroll up, or to the bottom half to scroll down. The farther the pointer sits above or below the middle of the scrollbar, the faster the scrolling will occur. To stop scrolling temporarily, position the pointer over the middle of the scrollbar. To turn off AutoScroll, you need only click the left mouse button.

If you use this handy feature often, you may want to place the command on a toolbar for convenience. Here's what to do: Select *Tools•Customize*, click the *Commands* tab, select *All Commands* in the left-hand box and *AutoScroll* in the right-hand box, and then drag and drop the command onto a toolbar.

AutoScroll even lets you turn Word 97 into a teleprompter. With a loaded document, select *View•Full Screen*. Press **<Alt>-T** to display the *Tools* menu; then follow steps 1 and 2 above (see **FIGURE 1**). The AutoScroll bar will appear to the right of the clean document screen, enabling you to control scrolling as described above.

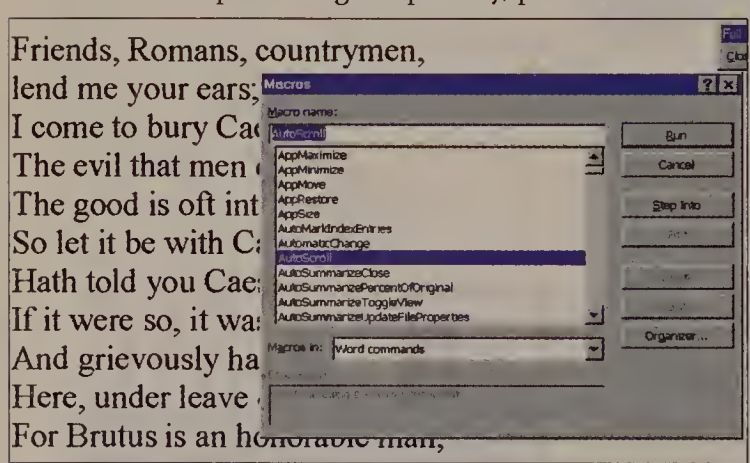
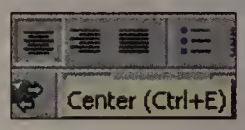


FIGURE 1: EXPLOIT THE HIDDEN AUTOSCROLLING feature in Word 97 by running a built-in macro.

DRESS UP WORD 97 TABLES

WORD 97'S NEW TABLE drawing tool makes it easy to customize tables. Here are a few tips for using it:

- **Create multiple cells of equal size** alongside a taller cell by highlighting the cells, then selecting *Table•Distribute Rows Evenly*. You can use the same simple approach to equalize the width of columns you draw. Just select *Table•Distribute Columns Evenly* after highlighting the desired cells.
- **Insert clip art and other graphics** into a table cell by placing your cursor in the cell, selecting *Insert•Picture•From File*, and choosing an image. If necessary, Word will automatically resize the cell to fit the image.
- **Add text to a cell that contains an image** by clicking the image, then pressing the left arrow, **<Enter>**, and the up arrow (to type text above the image), or the right arrow and **<Enter>** (to type text below).
- **Center an image in a cell** by clicking the image, and then pressing the left arrow to display the normal text insertion cursor. Click the *Center* icon on the Formatting toolbar to center the image horizontally, and click the *Center Vertically* icon on the Tables and Borders toolbar to center it vertically.



- **Add a border to an image** within a cell by right-clicking the image and selecting *Borders and Shading* from the menu. Choose your border style in the Borders dialog box. If you want the same border on several images, set the border for the first, then select each image and press **<Ctrl>-Y** to copy the formatting.

COPY WORDY TABLES TO EXCEL

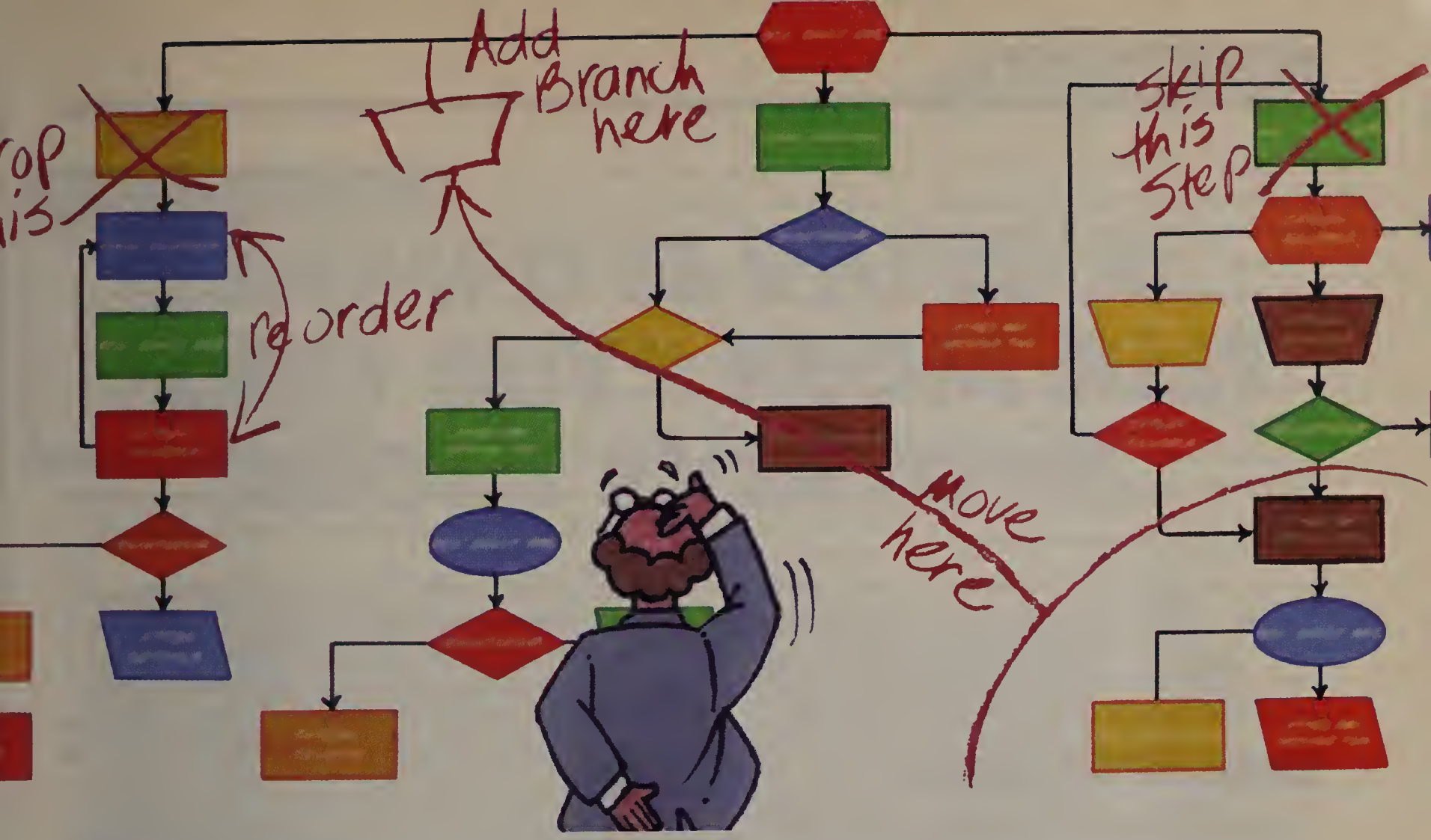
HAVE YOU EVER had to move a table with long cell entries from Word to Excel? When you paste the table into Excel, it looks like a mess. Here's how to make the move as simple as possible (see also **STEP BY STEP**). The following steps work in all versions of Office.

1. In Word, select the entire table; then choose *Edit•Copy*.
2. In Excel, place the pointer where ▶

Create a List of All Word Commands

WANT A LIST OF EVERY command and keyboard shortcut in Word? Select *Tools•Macro* (Word 95) or *Tools•Macro•Macros* (Word 97). In the Macros dialog box, choose *Word Commands* from the 'Macros in' list, and *List Commands* from the 'Macro name' list; then click *Run*. In the List Commands dialog box, choose *All Word commands* or *Current menu and keyboard settings*, then click *OK*. Print the list and keep it as a reference.

ILLUSTRATIONS: JEFFREY PELO



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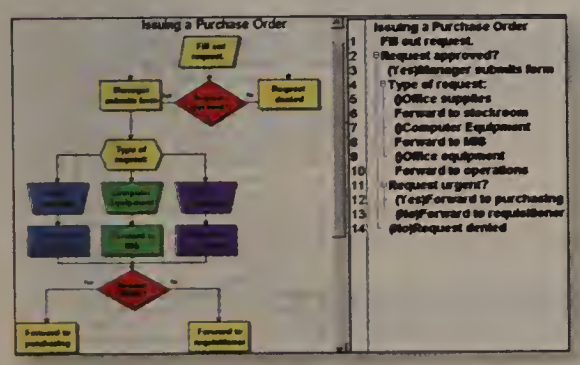

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you want the table; then select *Edit•Paste.*

3. Select the columns that contain the table, then change their width to match their width in Word.

4. With the table still selected, choose *Format•Cells,* click the *Alignment* tab, select *Top* from the Vertical drop-down list, and check the *Wrap text* box. Click *OK.*

5. To apply one of Excel's prefab formats to the table, select *Format•AutoFormat,* then choose one of the available formats.

WRAP IT UP IN WORDPERFECT

WRAPPING TEXT around the box that contains a graphical image looks amateurish compared with the effect you get when the text wraps around the actual contours of the image. Last November's issue contained instructions for doing sophisticated wraps in Word 97, but you can do the same thing in WordPerfect 6.1 and later, with a couple of provisos—namely, the image must have a white background, and you can't control the wrap points (see **FIGURE 2**).

To do a contour wrap, first type the text that will surround the image; then select *Insert•Graphics* (version 8) or *Graphics•Image* (versions 6.1 and 7). Choose *Clipart, From File,* or *Draw Picture* from the resulting menu, then select or draw the image (remember that it must have a pure white background). Drag the image into position on the page and resize it if necessary. Right-click the image, then choose *Wrap* from the menu. Select *Contour* in the Wrap Text dialog box, then click *OK.*

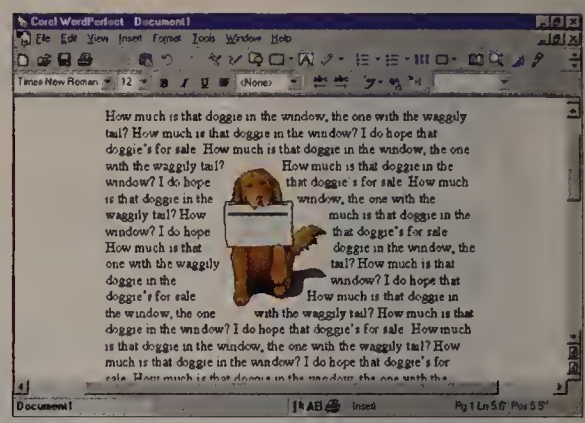
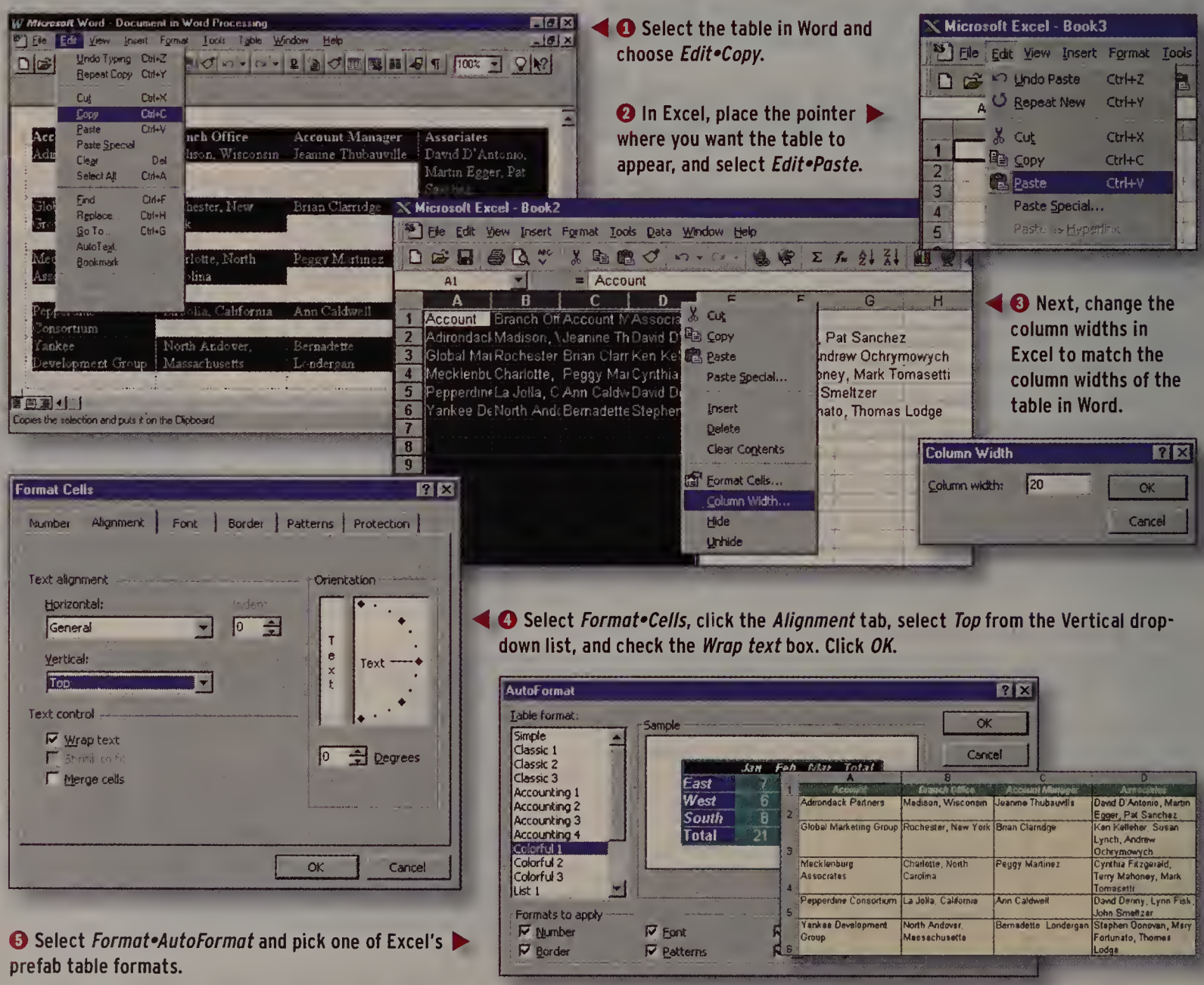


FIGURE 2: WORDPERFECT CAN WRAP TEXT around an image if its background is white.

Word Processing *welcomes your questions and tips and pays $50 for published items. Contributing Editor George Campbell is a contributor to* The PC Bible *(Peachpit Press, Berkeley, California, 1995). See page 14 for contact information.* ■

STEP BY STEP

Move Big and Wide Word Tables to Excel in Five Easy Steps



❶ Select the table in Word and choose *Edit•Copy.*

❷ In Excel, place the pointer where you want the table to appear, and select *Edit•Paste.*

❸ Next, change the column widths in Excel to match the column widths of the table in Word.

❹ Select *Format•Cells,* click the *Alignment* tab, select *Top* from the Vertical drop-down list, and check the *Wrap text* box. Click *OK.*

❺ Select *Format•AutoFormat* and pick one of Excel's prefab table formats.

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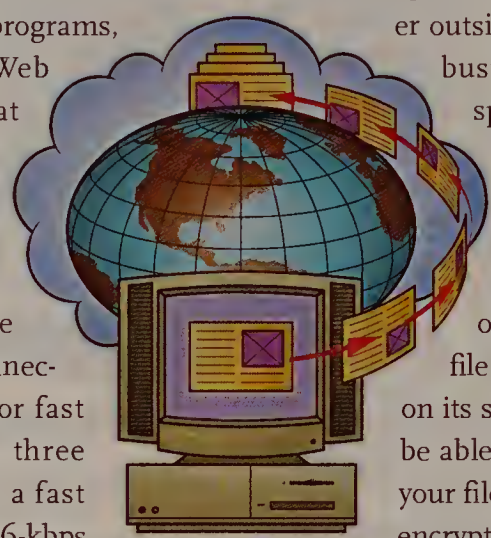
Will Adding Memory Speed Up My Browsing?

I'M THINKING OF adding 32MB of memory to my 166-MHz PC, which now has 32MB of RAM. Will this speed up my Web browsing? I already own a 56-kilobits-per-second modem, but my Internet service provider runs at 33.6 kbps.

Paul Farley, San José, Costa Rica

THAT EXTRA MEMORY may speed up graphics-intensive applications such as desktop publishing software, and it can help you juggle *lots* of programs, but it won't affect Web browsing. The rate at which you view Web pages is determined primarily by the speed of your connection to your ISP and by the speed of your ISP's connection to the Internet. For fast browsing, you need three things: a fast modem, a fast ISP (one that supports 56-kbps connections and has at least a T1 link to the Net backbone), and a high-quality phone line between the two.



CAN YOUR ISP BACK YOU UP?

MY ISP OFFERS 5MB OF storage to each customer. Since my Web page doesn't use half of that, I decided to create a backup directory under my main directory on the ISP's Web server. Now I regularly back up critical spreadsheet and word processing documents to it. Most ISPs back up their Web servers once a week, which makes them fairly safe for off-site storage.

Robert Collina, Westwood, New Jersey

THIS IS A GREAT IDEA, and I've practiced a variation of it: sending precious files as e-mail attachments to my mailboxes on America Online, CompuServe, or my ISP, and letting them sit there until I can get them to a safe-deposit box. But certain cautions spring to mind.

First, my ISP, highly reputed though it is, has lost my Web site twice in the past year, both times restoring it from backups that were more than a few weeks old. As a business owner, I would not trust backups of critical files to a computer outside my control—or to a business I am not paying specifically to safeguard my files—for more than 24 hours.

There's also a security issue. Depending on how your ISP sets up file and directory privileges on its server, Web surfers may be able to read and download your files. For absolute privacy, encrypt the files with Phil Zimmermann's Pretty Good Privacy utility, available on PC World Online. You should also store your files in a directory other than your Web directory, which is publicly readable. But even a non-Web directory may be read by the public. Again, it depends on how your ISP configures file privileges; talk to its techies to find out.

If you decide to store files in your Web directory, make sure you've created an index file for the directory. An index file (often named index.html) is the default Web page that anyone who accesses the directory without typing a more specific URL will see. If you don't provide one, then instead of a Web page, visitors will see a list of files in your Web directory—any of which they can access.

Help for Entrepreneurs on the Web

ALAN ZELL OF Portland, Oregon, suggests two Web sites for new business owners: the Service Corps of Retired Executives (www.score.org) and the Small Business Administration (www.sba.gov). SCORE offers free advice to start-up businesses on everything from accounting to employee relations; experts provide counseling through e-mail. The SBA offers free advice on government financing and start-up business programs.

EMAIL 97 HANDLES MULTIPLE ACCOUNTS

CHRISTOPHER ONG OF Jacksonville, Florida, asks us to recommend an e-mail program besides Outlook Express that can handle multiple e-mail accounts. "The problem with Outlook Express is that you can have only one default mail account," Ong writes, and that makes it too easy to send mail from the wrong account.

Jerry Hale of San Jose, California, wonders if there's an easy way to view subjects and sender addresses of messages before downloading them from an ISP. "I receive unwanted e-mail that is sometimes as large as 1.5 megabytes," Hale groans.

Here's a solution to both problems: Email 97 by E Corp (see **FIGURE 1**). This wonderful program easily handles multiple accounts. You select the account you wish to write mail from and the ▶

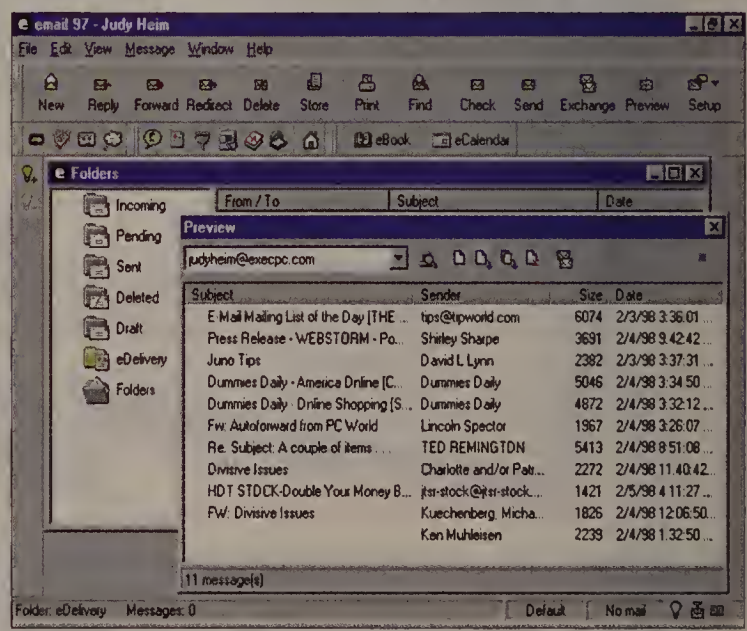


FIGURE 1: PREVIEW E-MAIL ON YOUR ISP'S SERVER before downloading it, by using Email 97.

ILLUSTRATIONS : JEFFREY PELO

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account you wish to check for mail. Email 97 also lets you preview mail on your ISP's server—retrieving what you want and deleting or leaving the rest.

And Email 97 enjoys other distinctions, such as sophisticated filtering that lets you automatically forward messages but keep copies, and bounce unwanted messages back to the sender. Buttons pop up on your browser and FTP menus. Email 97 costs $59.97 from E Corp. (www.e-corp.com, 412/921-2900). Download a 15-day trial version from PC World Online.

A CLEANING SERVICE FOR BROWSERS

STEVEN SINGLETON of West Point, Utah, sings the praises of Triceris Systems' $10 CacheCompactor, a program that sweeps out browsers' history, cookie, and cache files. It even does Windows, removing stray temporary files on demand, and it works with all versions of Internet Explorer, Navigator, and Communicator. You'll find it on PC World Online.

CHANGE YOUR AOL SCREEN NAME

"DON'T TAKE MY E-MAIL address seriously," a reader writes. "I chose it as a goof when my kids were mad at me and now I can't change it." His embarrassing cybermoniker: verybaddad@aol.com.

Unfortunately, the only way to change your master screen name on AOL is to cancel your account and open a new one.

You can, however, create up to four alternate screen names. Each name has its own password and e-mail folders. In fact, it's a good idea to use one screen e-mail address for posting public messages in AOL forums and Internet discussions, and another for private mail. Spams (most of them, anyway) will end up in the mailbox of your public screen name. Another tip: Don't post any information regarding your "private" screen name in AOL's member directory.

To create a new screen name, sign on to AOL, press **<Ctrl>-K**, and type the keyword **names**. Click *Create a Screen Name* and type a name and password.

KEEP JUNO SCREEN ADS FROM EATING YOUR HARD DISK

STEVE WOODWARD OF Morro Bay, California, writes that if you don't occasionally delete the folders into which Juno downloads advertisements each time you log on to the service, the folders will soon fill several megabytes of your hard disk. To delete them, double-click the *Ads* folder in the Juno directory. You'll spot several folders with names like 00000000 and 00000001. Drag them to the Recycle Bin.

BEAM ME DOWN, INTERNET EXPLORER!

JAKE POLLMANN OF Pleasant Grove, Utah, writes that you can do a lot more from the address bar in Internet Explorer 4.0 than navigate to URLs. For instance:

Send an e-mail message: Type **mailto:** followed by the address—for example, **mailto:judy_heim@pcworld.com**. (By the way, this works in Navigator, too.)

View your desktop: Type **desktop**. Or start typing the name of a Shortcut, and Internet Explorer will open the application.

Open My Computer: Type **my computer**, or the name you gave to My Computer.

Start a DOS app: Type **c:\command.com**.

Open a folder: Type its path name—for example, **c:\text**. You'll get a directory listing of the folder. You can open some files from here, too; and by clicking the down arrow, you can find and launch commands you've recently typed. This also works in Navigator.

WIN IT ON THE WEB

WHAT BETTER WAY to lure consumers to a dowdy corporate Web site than by giving away cars, computers, and trips? Last year, Home & Garden Television (www.hgtv.com) gave away a house. Kevin Goebel lists the best contests at mars.inwave.com/~kgoebel/contest.html (see **FIGURE 2**).

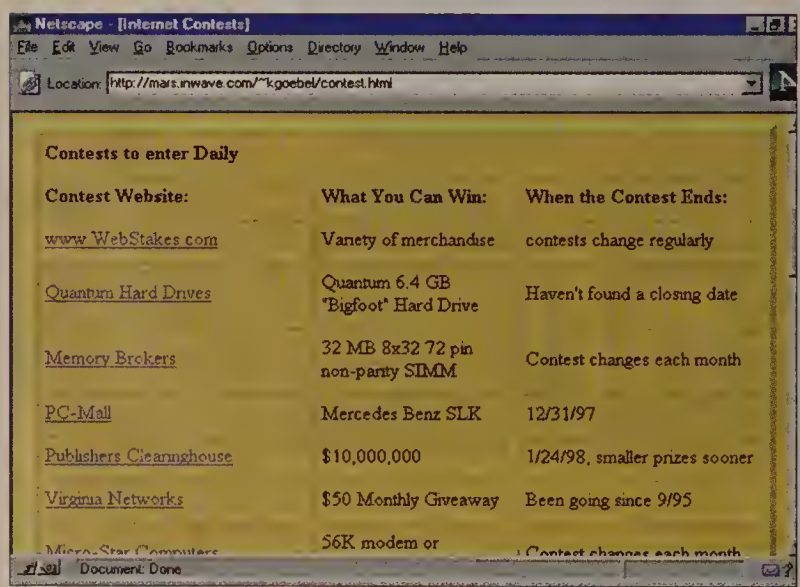

FIGURE 2: WIN FABULOUS PRIZES in Web contests. The best ones are at mars.inwave.com/~kgoebel/contest.html.

Find files from this article on PC World Online at www.fileworld.com. Internet Tips *welcomes questions and tips and pays $50 for published items. Contributing Editor Judy Heim is coauthor of* The Quilter's Computer Companion *(No Starch Press, 1997, 800/420-7240).* *See page 14 for contact information.* ■

Limit Hours on the Web

CAN YOU RECOMMEND a program for limiting the amount of time someone can use specific Internet services each day? When I'm at work, certain family members log on to the Web and stay there for hours. I don't want to eliminate Net access for my family, but I do want to control the phone bills.

Shane Fowlkes, Powhatan, Virginia

Net-Timer Pro from Simon Paradis (www.geocities.com/SiliconValley/Lakes/5716) is a $20 pop-up timer for Windows 95 that you can use to give each family member a daily allotment of Internet access time. The timer is password-protected, so only one person is allowed to configure each individual's time limit.

Net-Timer Pro works with any ISP. You can even configure it so that different people can use different ISPs. It won't work with America Online, however, which offers its own add-on, PowerWatch, for controlling online access (www.bpssoft.com/PowerWatch/library.htm).

Put the program in Windows' Start folder so that it fires up when the PC is booted. Beware that uninstalling Net-Timer Pro is as simple as using Windows' Uninstall feature, so it can be thwarted by clever children. Look for it on PC World Online.

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Reinstalling corrupt Windows 95 files ◆ When good Registries go bad

It's Not Brain Surgery, But It Can Help Your PC

ONE DARK DAY your PC freezes up, behaves erratically, or just doesn't start. Your first reaction: panic! Do you need to reinstall everything? Or maybe get a new hard disk? Or—gulp—buy a new PC?

Relax. Chances are good that you can fix your PC without resorting to high-risk surgery on its innards. In fact, you can carry out a number of repairs without spending a bundle on expensive calls to tech support. Here are guidelines on how to proceed.

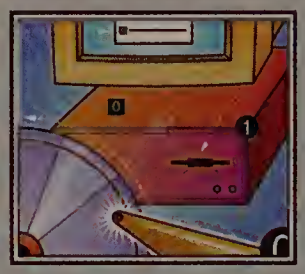
WHEN WINDOWS WON'T OPEN

IF YOU TURN ON your PC and Windows 95 won't load, you may have a problem with a device like a sound card or with a corrupted software driver. To check this:

Launch in Safe Mode. As soon as you see the 'Starting Windows 95' message on your screen, press **<F5>**. This launches a bare-bones version of Windows 95 that bypasses all the start-up files and loads the plain-vanilla VGA video driver. If it loads successfully, go to the Device Manager (select *Start•Settings•Control Panel*, double-click the *System* icon, and click the *Device Manager* tab). Then expand the entries in the device tree by double-clicking each one.

The tree expands to show any installed device for each type. Double-click a device's entry to open its Properties box, check the Device Status area for conflicts, and then click the *Resources* tab and look at the 'Conflicting device list.' If it reports a conflict, launch Windows 95's Hardware Conflict Troubleshooter (select *Start•Help*, click the *Contents* tab if it's not already on top, and double-click the *Troubleshooting* icon to open the list of Troubleshooters).

If there's no conflict, shut down and try this:



Launch with step-by-step confirmation. After you spot the 'Starting Windows 95' message, press **<F8>**. This will display the Windows 95 start-up menu. Option 5 walks you through start-up one step at a time. You can load or skip each device listed in the Registry and each action specified in your autoexec.bat and config.sys files. An error message will appear for any device or program that fails to load properly.

When you start step-by-step mode, you'll have the option to create a start-up log file, called bootlog.txt, in the root directory. Do so. This documents the successful—or unsuccessful—completion of each step. The data is arcane, but it can save you lots of time if you end up calling technical support.

UP AND STUMBLING

IF YOUR PC LOADS Windows 95 but has other problems while you're working, check Device Manager for hardware conflicts. If you have a good diagnostics utility handy, now's the time to use it. (For more information, see "Windows Utilities: Rx for Your PC" on page 110 of this issue.) Note that utilities such as Norton WinDoctor (see **FIGURE 1**) work best when they're installed *before* problems occur.

If you don't have a diagnostics utility on hand and need a solution now, start here:

Check your hard disk. Detect file errors and physical damage by running ScanDisk (*Programs•Accessories•System Tools•ScanDisk*). Select *Thorough* under 'Type of test.' If your disk has substantial physical damage, you want expert help. If it's got only a few damaged sectors, ScanDisk marks them so they won't be used, and tries to salvage their data. Run ScanDisk often; if new bad sectors keep showing up, your hard disk may be failing.

A few cross-linked files or lost sectors are nothing to worry about. But if ScanDisk reports lots of them—and especially if their file names have turned to gibberish—the File Allocation Table may be damaged. This is serious. You may need to reformat your hard drive, which we'll discuss next month.

Run an antivirus program. Viruses are easy to acquire, especially if you download lots of material from the Internet. Fight ▶

Freeze It, Buster

YOU CAN SPOT HARDWARE problems by closely watching the screen during boot-up. The computer exchanges greetings with each piece of hardware and confirms that it's operating properly. And it often sends a small status message to the screen. But these messages appear and disappear so quickly that they may be impossible to read.

The solution: Press **<Pause>** or **<F8>** to freeze the screen and look for error messages or other useful information. Then press any other key to continue boot-up.

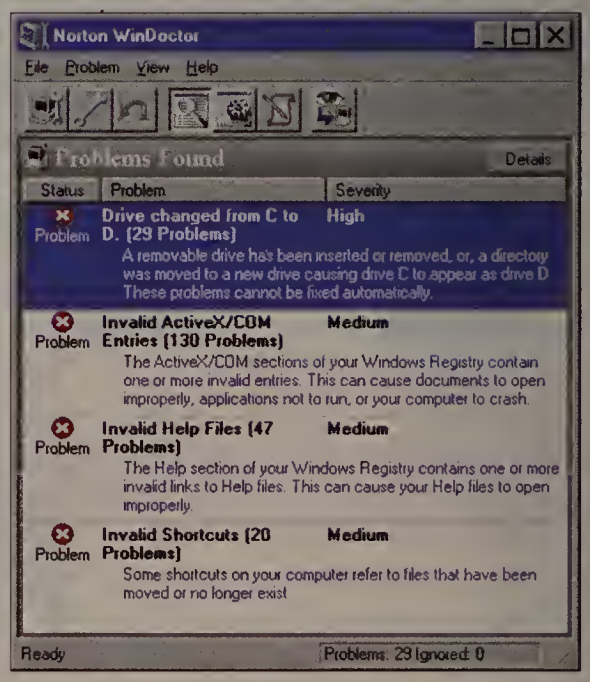


FIGURE 1: NORTON'S WINDOCTOR identifies and labels file problems by their severity.

ILLUSTRATIONS: JEFFREY PELO

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back with a good antivirus program.

But something as simple as shutting down your computer without closing Windows 95 properly, or deleting unwanted software instead of uninstalling it, also can lead to glitches and annoyances. Windows 95 and application programs operate in a complex web that relies on individual files located all over your hard disk. Consequently, a single corrupted file can get you knee-deep in trouble.

Hunting down the file at fault is like searching for a lost penny in a bog. Your best bet is to reinstall key files while changing your hardware and software settings as little as possible. The first step:

Reinstall suspect applications. If you're having trouble with a single program, try uninstalling and then reinstalling it. Don't just manually delete the program's files, because this may leave orphaned Registry entries and other files. Many applications come with an uninstall program that can be launched from the *Start•Programs* menu or from the Control Panel's Add/Remove applet. If you can't find an uninstall program, try a dedicated uninstallation utility. The next step:

Verify and reinstall Windows 95 files. To verify that no Windows 95 files are missing or corrupted, run the setup program from the Windows 95 CD or installation disk. The program will recognize that Windows 95 is already installed and, if you have the upgrade release of Windows 95, will display a dialog box with two choices. Select *Restore Windows files that are missing or corrupted* and proceed with the setup. If you have the standard version of Windows 95—the one that came with the PC, for instance—just perform a standard reinstallation. Either way, it will replace missing or damaged files. If Windows 95 asks whether you really want to overwrite a given file with an older version, make your best guess. You probably do, but this is not always true.

Remember to close down all programs before you reinstall Windows 95, including any that automatically run on start-up.

DAT'S ALL, FOLKS

Replace Windows 95 Registry files. Windows 95 continually tracks and stores your PC's current hardware and software configuration in the Registry. A sudden shutdown can leave Registry files incomplete or even damaged, leading to strange behavior.

Windows 95 stores Registry information in the files user.dat and system.dat in the Windows folder (in DOS, type **attrib user.dat -r -s -h**, for example, to remove read-only/system/hidden status for these files). Fixing a damaged Registry file is easy. Just overwrite the file with an undamaged copy—if you can find an undamaged copy, that is.

Every time Windows 95 launches successfully, it *does* automatically make backup copies of Registry files, called user.dao and system.dao. But if your files are already damaged from a previous session—say, after a power failure—then these backup copies will be damaged, too.

So you should make backup copies of user.dat and system.dat, and update them frequently—at least once a month—as well as every time you make a hardware or software change to your system. Because you may not discover a problem immediately, it's best to keep a chronological series of backup copies.

Don't use the utilities on the Windows 95 CD to back up the Registry, since they're buggy. Instead, just make a copy of each file and rename it. Ideally, you should make two copies, one on your hard disk and one on a floppy.

If you don't have a good recent backup copy of the Registry, there is one last hope. Windows 95 makes a copy of system.dat when it finishes its initial installation. The file is called system.1st and is located in the root folder. Like system.dat, system.1st reflects your PC's hardware configuration at the time of the initial Windows 95 installation, so you'll have to reinstall any hardware you added subsequently. If, however, your problems stem from user.dat—which focuses on software configuration— you're out of luck.

THE LAST RESORT

NOTHING WORKED? Sometimes you just need a fresh start, especially if you've installed and uninstalled lots of programs. We'll offer tips on reformatting hard drives next month. If you do decide to reformat your hard drive and reinstall everything, start by saving key Windows 95 files for future reference (see **FIGURE 2**).

Hardware Tips *welcomes your questions and pays $50 for published items. Kirk Steers is a* PC World *contributing editor. See page 14 for contact information.* ■

BACK UP THESE CONFIGURATION FILES

File name	What is it?
Located in the root folder of drive C:	
autoexec.bat config.sys	These old DOS configuration files are needed by some pre-Windows 95 software and hardware. Save any driver programs referenced in the files. For example, save your CD-ROM drive's DOS driver in case you need to reinstall Windows 95 from DOS.
system.1st	System.1st holds your PC's hardware configuration data for Windows 95's initial installation only; it contains no information about subsequently added hardware.
Located in your Windows folder:	
system.dat system.da0	System.dat holds your PC's hardware configuration data, and Windows 95 updates it automatically. System.da0 is a backup copy of system.dat made at the beginning of each session.
system.ini win.ini	These Windows 3.*x* configuration files are needed for pre-Windows 95 software or hardware.
user.dat user.da0	User.dat holds most user-specific software configuration data, including Windows 95 settings; Windows 95 updates it automatically. User.da0 is a backup copy of user.dat made at the beginning of each session.

FIGURE 2: IF YOU'RE TROUBLESHOOTING PC PROBLEMS, backup copies of these files can be lifesavers. Autoexec.bat, config.sys, and system.1st are located in your PC's root folder; the other files are in the Windows 95 folder (typically C:\windows).

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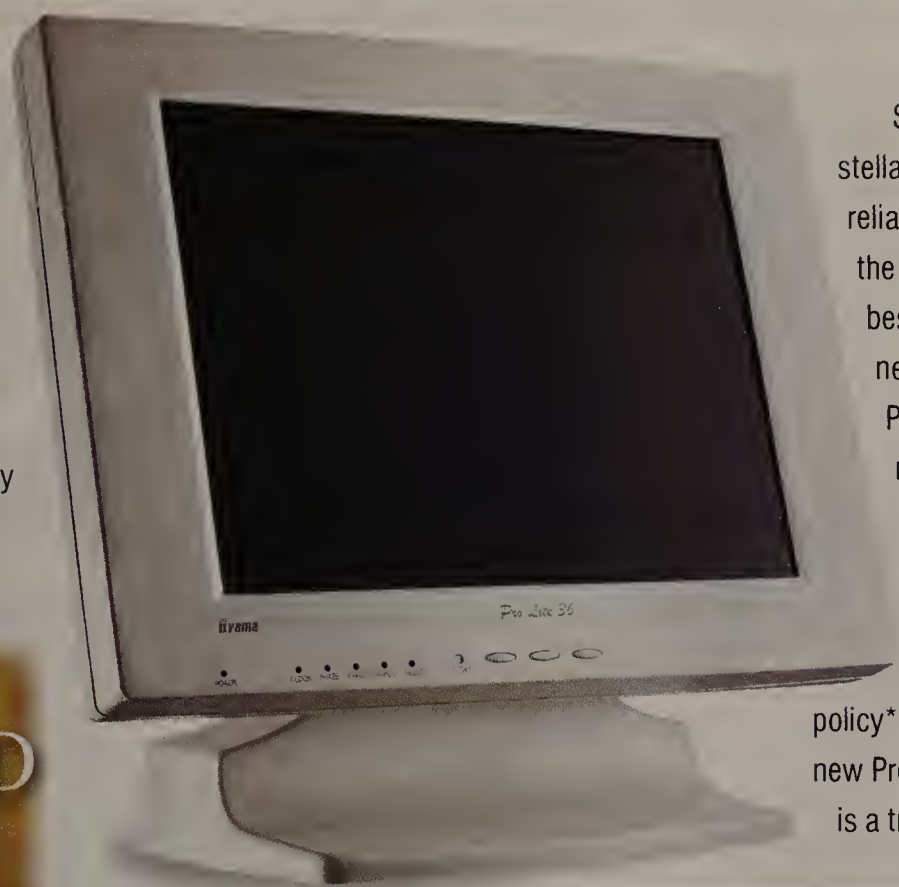

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Best Graphics Reseller News — *Performance & Technical Excellence*, March 1997, Vision Master Pro 21

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Enhance Your PC's Memory

YOU'RE DREAMING of one of those spanking-new loaded Pentium II-400 PCs—but it's only a dream. Even so, you do have some real options for rejuvenating your old PC. And of all the upgrades we cover in this column, extra memory is closest to a fountain of youth for PCs.

Windows 95 and NT hunger for memory. At an absolute minimum, you'll want 16MB of RAM—and much more if you like to switch among several memory-craving applications.

If your PC's hard disk activity light blinks inordinately often or your PC suddenly seems stuck in molasses, that's a good sign it's short on memory. When Windows runs out of memory, it starts swapping information to and from your hard disk—a vastly slower process.

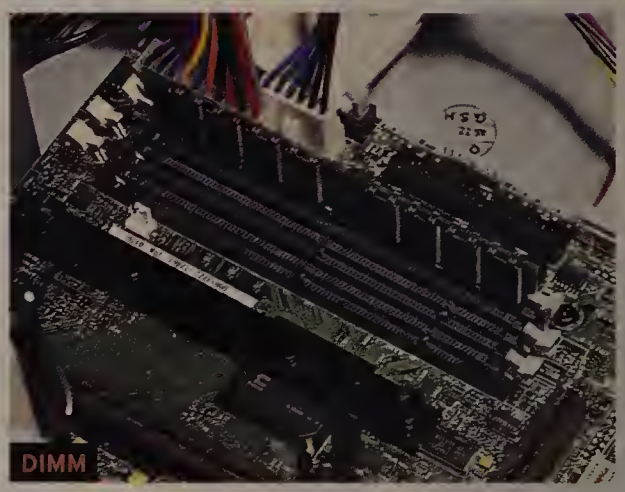
For most Windows 95 users, 32MB of memory is a good amount. But if you use space-hogging applications such as professional graphics applications or you run

1 Check your memory. Find out how much memory you currently have. Watch your system's RAM amount when you turn on your PC. If the system doesn't display this information, check your system setup (procedures for running this vary).

Alternatively, from within Windows 95, you can select *Start•Settings•Control Panel*, double-click the *System* icon, and look at what's on the General tab.

2 Locate the memory. Unplug your PC and remove its cover. If you're facing the front of the system, you'll typically find the memory slots on the left side of the motherboard, toward the front of the case; however, they may be hidden under cables or even under hardware such as a hard drive mounting bay. If you need to disconnect cables or temporarily remove hardware, keep close track of what's connected where and how it all fits back together.

Most PCs come equipped with slots for 72-pin SIMMs. Older PCs (especially those with 486 processors) may use 30-pin modules. The 72-pin SIMMs are 4.25 inches long, while 30-pin SIMMs measure about 3.5 inches; 168-pin DIMMs are 5.25 inches long and usually have memory chips on both sides.



3 Buy your memory. Consult your dealer, your PC maker's Web site, or Kingston Technology's site (www.kingston.com/catalog/memory/mem-idx.htm) for guidance on how to buy exactly the right memory for your PC.

If you're adding SIMMs, be prepared to grapple with many potential gotchas, particularly if you try to mix and match modules of different capacities. (In theory doing this should not raise problems, but in reality it occasionally does.) Pentium-based PCs require that SIMMs be installed in pairs. And depending on how many of your SIMM slots are already filled, you may need to remove existing SIMMs and replace them with higher-capacity models.

Because the industry has standardized on 16MB SIMMs, in many instances your best bet is to buy a pair of those.

If you're adding DIMMs, the task of selecting the modules is relatively straightforward.

PHOTOGRAPHS: KEVIN CANDLAND

a big database, stepping up to 64MB is wise. And if you're using Windows NT, 64MB is a reasonable minimum. You're unlikely to need more, though most motherboards made during the past several years can handle up to 256MB.

Fortunately, memory prices keep falling. At press time, 32MB cost about $70, making this a truly economical upgrade.

There's a huge and confusing variety of memory types available today. Most PCs made since 1994 use Extended Data Out (EDO) dynamic RAM chips mounted on single inline memory modules, better known as SIMMs. Newer machines often use synchronous dynamic RAM (or SDRAM) chips mounted on dual inline memory modules (DIMMs). Check your manual, or on some PCs your start-up screen, to find out what type of memory and module you now have and need for your upgrade. If your PC has both SIMM and DIMM slots, note that you usually can't mix the two types on the same motherboard. Upgrade with whichever type of memory your system already holds.

Most motherboards made since 1992 have a set of four long, typically white SIMM slots. Many motherboards made within the past year include one or two longer, black DIMM slots, which usually are empty. You can figure out how large each memory module is by dividing your total memory by the number of modules.

Adding RAM is one of the easiest system upgrades. Here's how to do it.

Stan Miastkowski is a contributing editor for PC World. ■

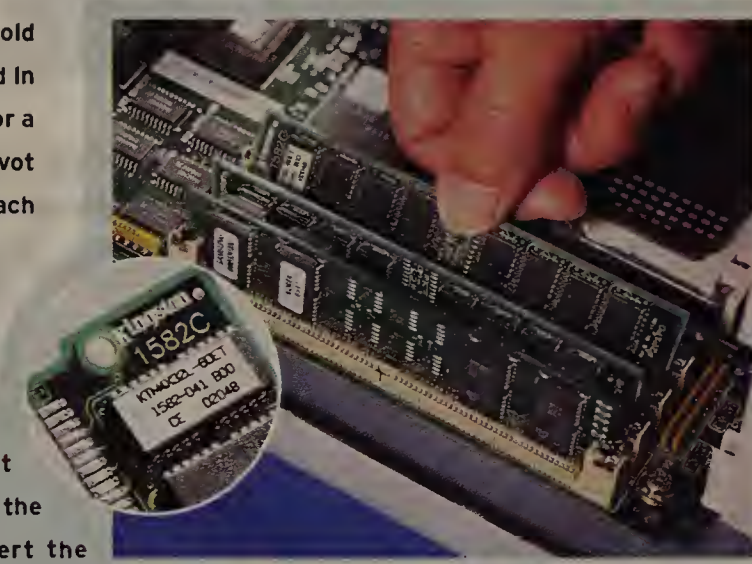
4 Remove the old memory (if necessary). If you have to remove some of your old memory to make room for new chips, work slowly and carefully. SIMMs are held in their slots by metal or plastic clips that grip them on each end. Use a fingertip or a small screwdriver to push each clip off the side. When the clips are released, pivot the SIMM sideways and you should be able to pull it out easily. Don't force it. Each SIMM has a notch on one side; note the notch's orientation as you remove it.

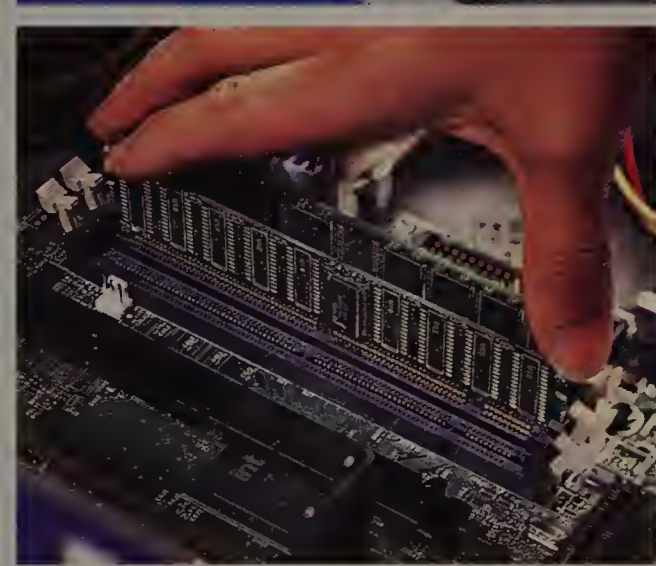
If your DIMM slot has clips, you can simply pull them out of the way—no screwdriver needed. If yours lacks clips, however, simply grasp each side of the DIMM carefully and rock it slowly until it releases from its slot.

5 Install the new memory. To install a new SIMM, first orient the notch (inset) in the correct direction and insert the module at an angle into the slot. Next, press down firmly on the SIMM and pivot it into a vertical position until the clips on each side click into place. Take care not to use excessive force. When correctly installed, a SIMM should be vertical and seated firmly in the slot.

In contrast, DIMMs simply plug tightly into their slots.

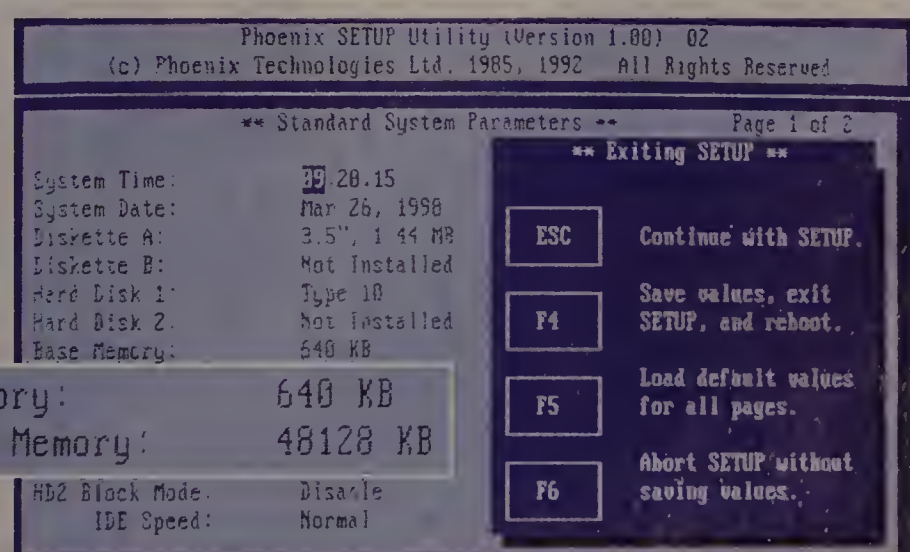
After you've finished, don't put the cover back on your PC until you are sure that everything works.





6 Check your new memory. Turn on your PC. Typically you'll see the new memory size displayed during start-up. Some older PCs will give you an error message, however, and require that you go into your system's setup routine. In this case, normally you won't need to enter the new amount of memory but can simply save the new settings and reboot.

If your PC doesn't display the new memory total, turn it off and check to make sure that the SIMMs or DIMMs are properly seated in their slots. If your machine continues to report a problem, it may have defective memory. Sometimes memory problems show up later on. Though these tend to be difficult to diagnose, likely symptoms include random lockups or reboots and corrupted files.



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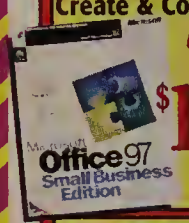

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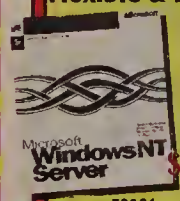

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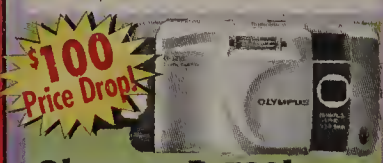

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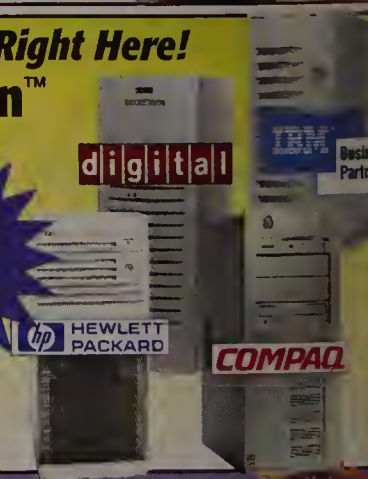

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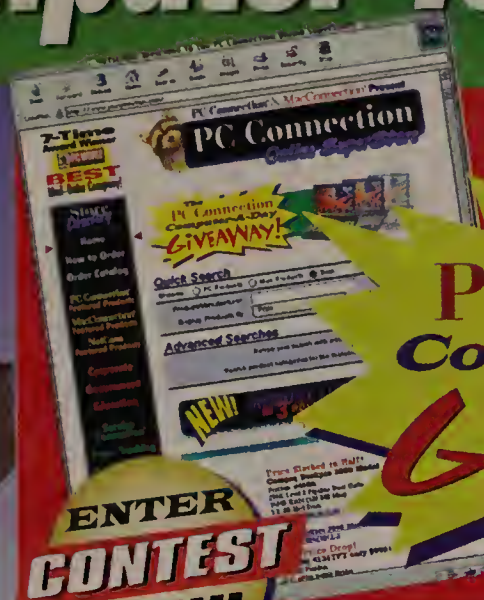

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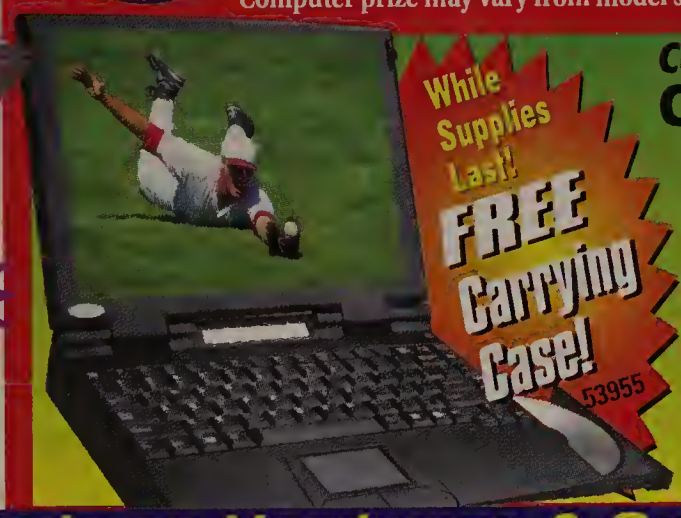

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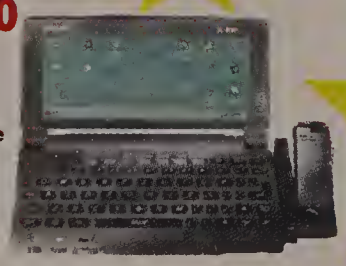

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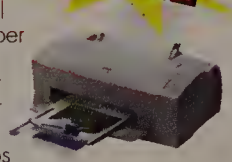

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brother

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D-200L/D-320L	$469/$657
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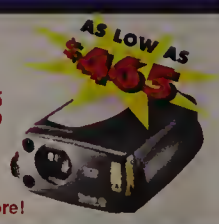

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CD-R - Hi-Val 6x/2x EIOE ... 299
CD-R - Smart&Friend. 6x/2x SCSI ... 369
CD-R - Smart&Friend. 12x/4x SCSI ... 449
CD-RW Hi-Val 6x/2x/2x EIDE ... 419
CD-RW HP Surestore 6x/2x/2x EIDE ... 419
CD-RW HP Surestore 6x/2x/2x Parallel ext ... 519
CD-RW Smart&Friend. 6x/4x/2x EIDE ... 589
DVD Creative Labs DVD 20XCD 2XDVD EIDE ... 145
PINNACLE MICRO - Entire Line ... CALL

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HP Colorado T3000 3.2G ... 149
HP Colorado T5000 5.0G IDE ... 189
IOMega Ditto 2.0G int / ext ... 109/157
IOMega DittoMax 7G ... 187
IOMega DittoMax 10G ... 275
Seagate Tapestore 3.2G / B.0G ... 149/215
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IOMega Zip Plus 100MB PAR&SCSI ext ... 185
Syquest EZ-Flyer 230 Par/ Syjet 1.5G int. ... 142/285
Syquest Sparq 1.0G IDE int / Par ext. ... 189/199

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Maxtor 2.1/4.3/5.7G Ultra ATA ... 139/186/224
Maxtor 6.5/8.4/11.5G Ultra ATA ... 239/319/419
Seagate 2.1/2.5/3.2G Ultra ATA ... 127/139/153
Seagate 4.3/6.5/8.6G Ultra ATA ... 172/229/319
Seagate 4.5/9.1/18/23G SCSI ... 291/435/13B9/1556
West Dig 2.0/6.4/8.6G Ultra ATA ... 165/219/339
Quantum 4.0/6.4/8.0G Ultra ATA ... 189/219/265

MODEMS

3COM / U.S. ROBOTICS

3CDM/USR V90 Winmodem 56K int. ... 95
3CDM/USR V90 Faxmodem 56K int./ext. ... 145/164
3COM/USR V90 Voice-Fax 56K int./ext. ... 164/227
Sportster 56K int/ext ... 136/155
Sportster 56K Voice int/ext ... 155/173
Courier V90 Everything 56K int./ext ... 239/269
Megahertz XJ2560 XJack 56K PCMCIA ... 175
Megahertz Combo XJack 56K / 10BT PCMCIA ... 259

MONITORS

EIZO BY NANAO

FX-B5	15"	1280x1024	28mm		509
FX-C5	17"	1280x1024	28mm		709
FX-C6	17"	1600x1200	26mm		789
TX-C7	17"	1600x1200	25mm		849
FX-D7	19"	1280x1024	26mm		1099
TX-D7	20"	1600x1200	25mm		1679
FX-E7	21"	1280x1024	28mm		1589
FX-E8	21"	1600x1200	26mm		2179

HITACHI

Pro 500	15"	1280x1024	28mm		291
Elite 630	17"	1600x1280	22mm		634
Elite 751	19"	1600x1200	22mm		866
Pro 800	21"	1600x1200	22mm		1249

PHILIPS/MAGNAVOX

15C3220	15"	1024x768	28mm		185
17C13A	17"	1024x768	28mm		389
CM5600	20"	1600x1280	28mm		949

MITSUBISHI

DPLUS70	17"	1280x1024	25mm		569
TFW9105SK	21"	1600x1200	28mm		1239

SONY

CPD-100ES	15"	1280x1024	25mm		319
CPD-200ES	17"	1280x1024	25mm		599
GDM-400PS	19"	1600x1200	25mm		1089
GDM20SE2T	20"	1600x1200	25mm		1179

VIEWSONIC/OPTIOUEST

O53	15"	1280x1024	28mm		215
Q71	17"	1280x1024	28mm		379
V95	19"	1600x1280	26mm		755
V115	21"	1600x1280	26mm		1075

VISIONMASTER BY IIYAMA

Pro35 LCD	13.8"	1024x768	LCD		1329
Pro36 LCD	14.1"	1024x768	LCD		1379
MT-9017E	17"	1600x1280	25mm		543
S901GT	19"	1600x1200	22mm		868
MT-8721	21"	1600x1200	27mm		1239
MT-9221	21"	1600x1200	28mm		1299

MULTIMEDIA

Altec Lansing ACS48 Powercube w/subwooler ... 125
Altec Lansing ACS500 5-Channel Dolby Speakers ... 239
Creative Labs Awe64 Value 16bit PNP ... 89
Creative Labs Awe 64 Gold 4M ... 139
Creative Labs PC-DVD Encore kit ... 269

NETWORKING

***** 3COM *****

3C509B ISA 10BT 1pk/5pk/20pk ... 56/267/993
3C905TX PCI 10/100BT 1pk/5pk/20pk ... 91/429/1599
3C575 PCMCIA 10/100BT 1pk/5pk/20pk ... 148/705/2745
Superstack II 10BT 12pt Hub/24pt Hub ... 215/329
Superstack II 10/100 12pt Hub/24pt Hub ... 883/1299

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Linksys Workgroup Hub B-port 100BTX ... 175
SMC Tigerstack 2BPort 10BT ... 779
SMC TigerHub 10BT 6-ports / 12-ports ... 159/343
SMC EtherEZ PCMCIA ... 129
Xircom NextGeneration E-net 10/100 Ready ... 139
Xircom 10BT/56K Combo ... 299
Novell IntraNetware v4 11 ... 5-user ... 659
Novell IntraNetware v4.11 ... 10-user ... 1249
Novell IntraNetware v4 11 ... 25-user ... 2099
Novell IntraNetware v4.11 ... 50-user ... 2799

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Back-UPS 900/1250 ... 339/449
Back-UPS Pro 280/420/650 ... 140/230/280
Smart-UPS 420VS/650VS/1000VS ... 259/295/435
Smart-UPS 450/700/1400/2200 ... 275/338/594/1029
Back-UPS Office 250 ... 119

PRINTERS

ALPS

MD2010	600dpi	color	inkjet		236
MD2300	600dpi	color	inkjet		619
MD4000	600dpi	color	w/scanner		419

CALCOMP

TechJet 720C	D-size / E-size				1989/2379

ENCAD

Croma 24	24"	600x300dpi	color		1759

EPSON

Stylus 400/600	4ppm	720/1440	color		175/239
Stylus 800	8ppm	1440x720	color		329
Stylus 1520	6ppm	1440x720	color, 17x22"		739
Stylus 3000	7ppm	720x720	color 13x19"		1699

HEWLETT PACKARD

Deskjet 670c/ 692c					199/239
Deskjet 720c / 870cxi / 890cxi					298/299/389
Deskjet 1600C / 1600CN / 1600CM					1299/1649/1899
DeskJet 1000CXI 3ppm	600dpi	color	letter,11x17		389
DeskJet 1120CXI 4.5ppm	600dpi	color	letter,11x17		477
LaserJet 6LXI	6ppm	600dpi	1MB		379
LaserJet 6PXI	8ppm	600dpi	2MB		729
LaserJet 6MP	8ppm	600dpi	3MB	postscript	879
LaserJet 5SI	24ppm	600dpi	4MB	network	2349
LaserJet 5SINX	24ppm	600dpi	4MB	ethernet	2649
LaserJet 5SIMX	24ppm	600dpi	12MB	e-net PS	3039
LJ 5 Color	10ppm	300dpi	20MB	color	3799
LJ 5M Color	10ppm	300dpi	36MB	color, PS	4849
LJ 5SIMopier	24ppm	600dpi	12MB	duplex	6699
LaserJet 4000	17ppm	1200dpi	4MB	postscript	1099
LaserJet 4000T	17ppm	1200dpi	4MB	3-tray	1259
LaserJet 4000N	17ppm	1200dpi	8MB	ethernet	1419
LaserJet 4000TN	17ppm	1200dpi	8MB	3tray/enet	1579
LaserJet 5000	16ppm	1200dpi	4MB	postscript	1470
LaserJet 5000N	16ppm	1200dpi	8MB	postscript	2075
LaserJet 5000GN	16ppm	1200dpi	12MB	postscript	2619

LEXMARK

Jetprinter 1000 / 2030 / 2055					139/179/199
Jetprinter 3000 / 2070 / 7000 / 7200					239/289/349/399
Optra ES+	6ppm	600dpi	2MB	Heavy Paper	539
Optra E+	6ppm	600dpi	2MB		378
Optra N240	24ppm	600dpi	4MB	11x17	2637
Optra N245	24ppm	600dpi	16MB	11x17	3179
Optra S1250	12ppm	1200dpi	4MB		999
Optra S1650	16ppm	1200dpi	4MB		1099
Optra S1250N	12ppm	1200dpi	4MB		1299
Optra S1650N	16ppm	1200dpi	4MB		1399
Optra S2450	24ppm	1200dpi	4MB		2149
Optra S2450N	24ppm	1200dpi	12MB		2499
Optra SC1275	12ppm	600dpi	32MB	Color	3569
Optra SC1275N	12ppm	600dpi	32MB	Color	4269

OKIDATA

Turbo 184/320/321/520/521					225/315/442/379/489
Pacemark 3410 Dot Matrix (multi-part forms)					1369
OkiPage 4W	4ppm	600dpi			192
OkiPage 6E	6ppm	600dpi			287
OkiPage 6EX	6ppm	600dpi	2MB		419
OL810E	8ppm	600dpi	2MB		575

OMS

Magicolor 2 CX	16ppm	600dpi	24MB	Color	3269

SCANNERS

HEWLETT PACKARD

ScanJet 5S 300x300 24bit sheetfeed parallel ... 187
ScanJet 5100Cxi 300x600 36bit parallel ... 299
ScanJet 6100C 600x600 30bit ... 719
ScanJet 5 Network-Enel 50-pg feeder ... 2309

MICROTEK

ScanMaker V310 300x600 30bit Color ... 136
ScanMaker V600 600x1200 30bit Color ... 227
ScanMaker E3 Plus 300x600 30bit parallel ... 139
ScanMaker E6 Pro 600x1200 30bit w/full Phtshp ... 499
ScanMaker 6400XL 400x800 36bit Tabloid size ... 915
ScanMaker 9600XL 600x1200 36bit Tabloid size ... 1369
ScanMaker III 600x1200 36bit w/full Phtshp*** ... 1299
ScanMaker 5 1000x2000 36bit w/phtshp LE ... 2289

UMAX

PageOffice Color IIC 300x600 24bit (scan books) ... 149
Astra 610P 300x600 30bit parallel ... 125
Astra 610S 300x600 30bit SCSI ... 139
Astra 1220P 600x1200 36bit parallel ... 185
Astra 1220S 600x1200 36bit SCSI ... 215
PowerLook II 600x1200 36bit w/full Phtshp ... 1259

VIDEO

AITech Pro PCTV+ / Wavewatcher TV-2 ... 139/268
ATI Xclaim 3D 4mb PCI ... 181
ATI All-In-Wonder 4MB TV-tuner/capture ... 175
ATI All-In-Wonder Pro 8MB TV-tuner/capture ... 267
Diamond Speedstar 64 2200 /Monster 3D ... 97/179
Intel SmartVideo III ... 171
Matrox Millennium II PCI 4M/8M ... 169/235
Matrox Mystique PCI 2M / 4M ... 79/105
Matrox Productiva ... ALL MODELS ... Call
Sigma Reel Magic Ultra MPEG ... 294

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* * * * COMPUTERS * * * *

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Presario 4505	P166MMX	16M	2.1G	16X		33.6K	999
Presario 4540	AMD233MMX	32M	3.2G	20X		56K	1041
Presario 4640	P266MMX	32M	4.0G	DVD		56K	1719
Presario 4660	Pent II-300	32M	8.0G	DVD		56K	2025

WORKSTATION PC'S

COMPAQ

Deskpro 2000	P166MMX	16M	2.1G		3 HD Bays	989
Deskpro 2000	P166MMX	32M	3.2G	16X	3 HD Bays	1029
Deskpro 2000	Pent II-233	32M	3.2G	24X	Matrox 4MB	1749
Deskpro 2000	Pent II-266	32M	3.2G	24X	Matrox 4MB	1929
Deskpro 2000	Pent II-300	32M	3.2G	24X	Matrox 4MB	2179
Deskpro 4000S**	P166MMX	16M	2.1G		10/100TX	999
Deskpro 4000S**	P233MMX	32M	2.1G		10/100TX	1439
Deskpro 6000	Pent II-233	32M	2.1G	24X	Ultra SCSI	1999
Deskpro 6000	Pent II-266	32M	4.3G	24X	Ultra SCSI	2419
Deskpro 6000	Pent II-300	64M	4.3G	24X	Ultra SCSI	2869
Deskpro 6000	Pent II-333	64M	4.3G	24X	Ultra SCSI	3138

* no floppy drive, no open expansion bays. ** with floppy & 1 open expansion bay.

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IBM

PC300GL	P233MMX	32M	2.5G	16X		1052
PC300GL	Pent II-300	32M	4.2G	16X	Win NT	2655
Intellistation	Pent II-266	64M	4.3G	16X		2999
WS M-Pro	Pent II-300	32M	4.2G	24X		3199

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MCWORKS	P200MMX	32M	3.2G	32X		919
MCWORKS	P233MMX	32M	4.3G	32X		1029
MCWORKS	Pent II-233	32M	5.2G	32X	10/100	1219
MCWDRKS	Pent II-266	32M	5.2G	32X	10/100	1379
MCWORKS	Pent II-300	64M	5.2G	32X	10/100	1629
MCWDRKS	Pent II-333	64M	5.2G	32X	10/100	1689
MCWORKS	Pent II-333	128M	11.5G	32X	10/100	1999

TOSHIBA

Equium 7000	Pent II-233	32M	3.0G	24X	10/100	1415
Equium 7000	Pent II-266	32M	4.0G	24X	10/100	1569
Equium 7000	Pent II-300	32M	4.0G	24X	10/100	1786

SERVERS

COMPAQ

Prosignia 200	Pent II-233	32M	no HD	16X	Netelligent	1999
Proliant 2500	Pent Pro 200	32M	no-HD	8X	5 Plug. Bays	4099
Proliant 5500	Pent Pro 200	128M	no-HD	8X	Netelligent	1099
Proliant 6500	Pent Pro 200	128M	no-HD	16X	exp. 4 Proces.	14699
Proliant 7000	Pent Pro 200	128M	no-HD	16X	18 HD Bays	16719

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Netserver E45	Pent II-233	32M	no-HD	24X	4 HD Bays	1929
Netserver LCII	Pent II-266	32M	no-HD	24X	4 HD Bays	2240
Netserver LCII	Pent II-266	64M	no-HD	24X	NETRAID	2979
Netserver LCII	Pent II-300	64M	no-HD	24X	4 HD Bays	2455
Netserver LHII	Pent II-300	64M	no-HD	12X	Dual Proc	4656
Netserver LHII	Pent II-333	64M	no-HD	12X	Dual Upgrdbl	4390

IBM

PC Server 315 series	ALL MODELS					IN STOCK
PC Server 325 series	ALL MODELS					IN STOCK
PC Server 330 series	ALL MODELS					IN STOCK
PC Server 704 series	ALL MODELS					IN STOCK

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* * * * NOTEBOOKS * * * *

COMPAQ

Presario 1215	180MMX	12.1"D	24M	1.6G	14X	56K		1529
Presario 1220	200MMX	12.1"D	32M	2.1G	20X			1829

CTX

EZ360D-K	P166MMX	12.1"D	16M	2.0G	16X			1145
EZ360T-K	P166MMX	12.1"T	16M	2.0G	16X			1292
EZ372T-K	P200MMX	12.1"T	24M	2.0G	20X		33.6	1459
772MS-MK	P200MMX	12.1"D	24M	2.0G	20X		33.6	1379
772MT-MK	P200MMX	12.1"T	24M	2.0G	20X		33.6	1529
77FMS-FK	P200MMX	12.1"D	40M	2.0G	20X	56K		1499
774MT-FK	P200MMX	12.1"T	40M	2.0G	20X	56K		1649
777MS-FK	P200MMX	12.1"D	72M	2.0G	20X	56K		1749
777MT-FK	P200MMX	12.1"T	72M	2.0G	20X	56K		1899

FUJITSU

Lifebook 770TX	P200MMX	12.1"T	32M	3.2G	20X	56K		2449
Lifebook 790TX	P266MMX	12.1"T	32M	4.0G	20X	56K		3429
Lifebook 985TX	P233MMX	13.3"Tx	32M	5.0G	20X	56K		4299

HITACHI

Visionbook Plus	P166MMX	12.1"D	16M	2.1G	20X	56K		1510
Visionbook Pro	P233MMX	13.3"T	32M	3.2G	20X	56K		3351
Visionbook Pro	P266MMX	13.3"Tx	48M	4.0G	20X	56K		3999

IBM

Thinkpad 380ED	P166MMX	12.1"T	16M	3.0G	20X			2758
Thinkpad 560X	P200MMX	12.1"D	32M	2.1G				2463
Thinkpad 560E	P166MMX	12.1"T	16M	2.1G				2919
Thinkpad 760XD	P166MMX	12.1"Tx	32M	3.0G	8X		28.8	3981
Thinkpad 765D	P166MMX	13.3"Tx	32M	3.0G	8X		33.6	4099
Thinkpad 770 series	*Custom Build To Order*							As Low As 3599

SHARP

PC9330T	P150MMX	12.1"T	32M	2.1G	14X		33.6	1929
PC9800T	P166MMX	12.1"T	32M	2.0G	10X		33.6	2049
PC9820T	P233MMX	13.3"Tx	32M	3.0G	14X	56K		3679
PC-9340T	P166MMX	12.1"T	32M	2.1G	14X	56K		2149
PCM-100	P200MMX	12.1"T	32M	2.1G	20X	56K		2999
PCM-200	P200MMX	12.1"T	32M	3.2G	20X	56K		3459

TROGON

QUALITAS	P166MMX	12.1"Tx	16M	2.1G	20X		33.8	1589
SUPERUS	P200MMX	13.3"Tx	16M	2.1G	20X		33.6	2425
SUPERUS	P233MMX	14.1"Tx	32M	5.0G	20X		33.6	3029
SUPERUS	P266MMX	14.1"Tx	32M	3.0G	20X		33.6	3122

TOSHIBA

Libretto 100CT	P166MMX	7.1"T	32M	2.0G				2425
Satellite Pro 440CDT	P133MMX	12.1"Tx	16M	1.4G	10X		33.6	1949
Satellite Pro 460CDX	P166MMX	12.1"D	32M	2.0G	10X		33.6	1780
Satellite Pro 470CDT	P200MMX	12.1"T	32M	2.0G	10X		33.6	2917
Satellite Pro 480CDT	P233MMX	12.1"T	32M	3.8G	10X		33.6	3511
Satellite Pro 490CDT	Pent II 233	12.1"T	32M	4.0G	20X		33.6	3529
Satellite Pro 490XCDT	Pent II 266	13.3"Tx	32M	4.0G	20X	56K		3949
Portege 300CT	P133MMX	10.4"Tx	32MB	1.5G	opt		33.6	1936
Portege 320CT	P266MMX	10.4"Tx	32MB	3.8G	opt	56K		3649
Tecra 520CDT	P166MMX	12.1"T	32M	2.0G	10X		33.6	2541
Tecra 520CDT	P166MMX	12.1"T	32M	3.8G	10X		33.6	2749
Tecra 530CDT	P166MMX	12.1"Tx	32M	2.0G	10X		33.6	2875
Tecra 550CDT	P266MMX	12.1"Tx	32M	3.8G	20X	56K		3877
Tecra 730XCDT	P150MMX	12.1"Tx	16M	2.0G	10X		28.8	1472
Tecra 740CDT	P166MMX	13.3"Tx	16M	2.9G	10X		28.8	2499
Tecra 750CDM	P233MMX	13.3"Tx	32M	4.8G	20X	56K		4849
Tecra 750DVD	P233MMX	13.3"Tx	64M	4.8G	DVD	56K		5237
Tecra 780CDM	Pent II 266	13.3"Tx	64M	5.1G	20X	56K		5049
Tecra 780CDM	Pent II 266	13.3"Tx	64M	8.0G	20X	56K		5049
Tecra 780DVD	Pent II 266	13.3"Tx	64M	5.1G	DVD	56K		5449
Tecra 780DVD	Pent II 266	13.3"Tx	64M	8.0G	DVD	56K		5849

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#24680	480CDT	233MMX*	32	4GB	10X	12.1" TFT	$3,459
#30978	780CDM	PII266MMX*	64	5.1GB	20X	13.3" TFT	$4,999
#30976	780DVD	PII233MMX*	64	5.1GB	DVD	13.3" TFT	$5,379
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#24693	750CDM	233 MMX*	32	4.0GB	–	13.3" TFT	$4,879
#26073	750DVD	233 MMX*	64	4.7GB	–	13.3" TFT	$5,249
#97055	530CDT	166 MMX*	32	2.1GB	10X	12.1" TFT	$2,899
#28420	550CDT	266 MMX*	32	4.0GB	20X	12.1" TFT	$3,879
#30980	490CDT	PII233MMX*	32	4GB	20X	13.1" TFT	$3,479
#30982	490XCDT	PII266MMX*	32	4GB	20X	13.3" TFT	$3,929
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#28627	TP380XD	233MHz MMX*	32	4.0GB	20X	12.1" TFT	$2,569
#28625	TP380XD	266MHz MMX*	32	5.1GB	20X	12.1" TFT	$2,949
#30319	TP380XD	PII266MHz	32	5.1GB	10-24X	12.1SVGA	$3,719
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#28622	TP560X	200MHz MMX*	32	2.1GB	—	12.1" HPA	$2,099
#11247	TP560X	233MHz MMX*	32	4GB	—	12.1" TFT	$2,949
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#30321	TP600	233MHz MMX*	32	3.2GB	—	13.0" TFT	$3,549
#30322	TP600	PII233MHz	32	3.2GB	—	13.3" TFT	$5,049
#30323	TP600	PII266MHz	32	4.0GB	—	13.3" TFT	$5,919
ThinkPad 770							
#99904	TP770	200MHz MMX*	32	3.2GB	—	13.3" TFT	$2,859
#99910	TP770	233MHz MMX*	32	5.1GB	—	14.1" TFT	$4,139
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#14710	1590DMT	166MHz MMX*	16	2.1GB	20X	12.1" TFT	$2,569
#26786	1592DMT	233MHz MMX*	32	3.1GB	20X	12.1" TFT	$3,149
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#14625	PII 300MHz MMX*	32	3.2GB	16X	DT	$2,099
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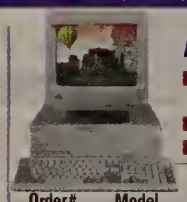

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		x64	x72 ECC	PC-100	PC-100 ECC
3.3V	8Meg	34	—		
3.3V	16Meg	39	59	44	59
3.3V	32Meg	64	79	64	109
3.3V	64Meg	139	169	159	279
3.3V	128Meg	299	349	299	569
3.3V	256Meg	CALL	1079	CALL	CALL

INDUSTRY STANDARD DIMMS

Unbuffered	16Mg	32Mg	64Mg	128Mg	256Mg
3.3V ECC, EDO	55	84	169	349	—
3.3V EDO	44	74	139	—	—
5.0V EDD	44	74	139	—	—

Buffered	16Mg	32Mg	64Mg	126Mg	256Mg
3.3V ECC, EDO	55	84	169	349	769
3.3V ECC, FPM	55	84	169	349	769
5.0V ECC, FPM	55	84	169	—	—

72 PIN SIMMS (FPM, EDO)

	60NS	70NS	80NS
16x32 64 mg EDD	159	159	159
8 x 32 32 mg EDO	54	59	59
4 x 32 16 mg EDO	29	29	29
2 x 32 8 mg EDO	18	18	18
1 x 32 4 mg EDD	12	12	12
16 x 32 64 mg	169	169	169
8 x 32 32 mg	61	61	61
4 x 32 16 mg	31	31	31
2 x 32 8 mg	18	18	18

	60NS	70NS	80NS
1 x 32 4 mg	11	11	11
512 x 32	9	–	
256 x 32	6	–	
16 x 36 64 mg	169	169	169
8 x 36 32 mg	69	69	69
4 x 36 16 mg	44	44	44
2 x 36 8 mg	29	29	29
1 x 36 4 mg	18	18	18
512 x 36	7	–	
256 x 36	14	–	

SIMM MODULES

(Add $5.00 for SIPP)	60NS	70NS	80NS
1Meg x 3 (3 chip)	9.00	9.00	9.09
1Meg x 9 (9 chip)	5.00	5.00	5.00
4Meg x 3 (3 chip)	14.00	14.00	14.99
4Meg x 9 (9 chip)	17.00	17.90	17.09
16Meg x 9 (9 chip)	59.00	59.90	59.90

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- *256K (160 pin) Pipeline Burst Cache Module $22.00 (Coast Celp)*
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- *256K (160 pin) Async Cache Module - $59.00 compatible with IBM Aptiva A&M Series*
- *256K (160pin) Async Coast Module - $29.00*

	12NS	15NS	20NS	25NS
32Kx8	9.00	4 50	4.25	4.00
64Kx1	–	11 00	–	–
64Kx8	–	15.00 (5V)	–	–
128Kx8	–	29 50	26 00	24.00

Individual D-RAM Chips

	40NS	50NS	60NS	70NS	80NS
1Megx1	–	–	5 00	4 00	2.00
1Megx4	–	–	19 00	18.00	17 00
1Megx4 (Zip Pk)	–	–	12.00	11.00	19 00
256x4(Page Dip)	–	–	7.25	6.75	6 50
256x4(Page Zip)	–	–	9.25	9 00	8.95
256x4(Video Zip)	–	–	–	10 95	9.95
256x8(SOJ)	–	–	12 00	11 00	–
256x16 SOJ	34 00	29 00	29 00	19 00	–
256x16 SOJ Edo	–	–	29 00	–	–
256x16 Video Zip	–	–	–	29 00	–

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Matrox Millennium	2Meg/4Meg/6Meg WRAM	69/129/179
Matrox Millennium II	4 Meg/8Meg/12Meg	119/209/Call
Matrox Mystique	2Meg SGRAM	49
ATI 3D Pro Turbo	2Meg/4Meg	49/95
ATI Xclaim 3D	4Meg SGRAM	69
ATI 3D Xpression	2Meg SDRAM	49
Apple PowerMac 4400	4 Meg	99
NEC Powermate Pro 150, 220	2Meg./6Meg WRAM	129/189
HP Vectra XV/6, VT/6, VA, XA	2Meg/6Meg WRAM	129/189
Compaq 1Meg Video 213922-001	1Meg	29
Compaq Deskpro 2000, 4000, 6000	2Meg/6Meg WRAM	129/189
144 pin SD Dimm (SGRAM)	2Meg/4Meg/8Meg	39,69,99
Apple PowerMac G3	2Meg/4Meg/8Meg	39/59/99

Many More Please Call

GATEWAY MEMORY

Dest Big Screen D5 – SDRAM	8Meg/16Meg/32Meg/64 Meg	39/49/69/159
Dest Big Screen D6 – EDD (pairs)	4Meg/8Meg/16Meg/32Meg	11/21/39/79
Family PC w/MMX – SDRAM	8Meg/16Meg/32Meg/64Meg	39/49/69/159
G5-166, 200 Prof. System – SDRAM	8Meg/16Meg/32Meg/64Meg	39/49/69/159
G5-166M, 200M MMedia System – SORAM	8Meg/16Meg/32Meg/64Meg	39/49/69/159
G6-200 Prof. System – SORAM	16Meg/32Meg	69/119
G6-Prof, M MMedia System – EDD	4Meg/8Meg/16Meg/32Meg	11/21/39/79
Multimedia G-5 Systems – SDRAM	8Meg/16Meg/32Meg/64Meg	39/49/69/159
Prof, P-5 Series – SDRAM	8Meg/16Meg/32Meg/64Meg	39/49/69/159

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Ready 5919, 7910, 7029, 9019, 9022 / Ready 9510, 9529, 9522, 9530, 9532 / Ready 7022 (EDD)
Image P60, P90, D, P109E
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HEWLETT PACKARD MEMORY

Netserver 4/66LC-5/133LC (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Netserver LE 486SX33 – 4860X266	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Netserver LH Plus 5/133, 5/166 (EDD, ECC)	16Meg/32Meg/64Meg/128Meg	49/89/199/419
Netserver 4/33LM – 5/100LM (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Netserver 5/75LS – 5/133 LS4 (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Pavillion 5010-717D (pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Vectra 500 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Vectra VA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Vectra VE2 5/75 – 5/133 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Vectra XA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	11/19/39/79
Vectra XM4 Series	4Meg/8Meg/16Meg/32Meg	14/23/49/89

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Aptiva 300, 500 Series	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva 700 Series (pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva A Series (pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva C Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva M Series	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 330 Model 6577 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 350 Model 6587 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/89
PC 730 Model 6877 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/89
PC 750 Model 6887 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/89
PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249
P/S 1, 30 Pin Simms	1/Meg/4Meg	10/24
P/S 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	19/34/57/89
P/S 2, 53, 53LS, 56, 57	4Meg/8Meg	29/59
P/S 2 Server, 95, 195, 295 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	39/41/64/119

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NOTEBOOK & LAPTOP MEMORY

MODEL	AMT. UPGRA9E9	MEMORY PRICE	BATTERY NimH	Li-on
Thinkpad 310E, ED, 315	16Meg/32Meg	89/149		
Thinkpad 349, 345, 355, 369, C, CE	*4Meg/8Meg/16Meg*	*44/54/74*	*119*	
Thinkpad 365C, CS, CD, E, ED	*4Meg/16Meg*	*34/74*	*195*	
Thinkpad 365X, 365XD	*8Meg/16Mag/32Meg/64Meg*	*29/44/99/179*	*195*	
Thinkpad 380, 3809, 385D	*8Meg/16Meg/32Meg/64Meg*	*29/44/99/179*	*119*	*236*
Thinkpad 500, *519CS*	4Meg/8Meg/16Meg	49/54/79	*166, 189*	
Thinkpad 560, 569E	*6Meg/19Meg/32Meg/64Meg*	*29/44/99/179*	*241*	
Thinkpad 709, 720, 759, CL57SX	*4Meg/8Meg/16Meg/32Meg*	*54/79/99/199*	*149, 175*	
Thinkpad 791, 791C, 791CS	*4Meg/8Meg/16Meg/32Meg*	*26/34/54/119*	*119*	
Thinkpad 755C,CE,CD,CS,C9V,CSE,CV	*4Meg/8Meg/16Meg/32Meg*	*49/69/99/199*	*149*	*271*
Thinkpad 769C, CD, L, LD	*8Meg/16Meg/32Meg*	*39/55/119*	*149*	*271*
Thinkpad 760E, E9, EL, ELD	*6Meg/16Meg/32Meg*	*29/49/99*	*149*	*271*
Thinkpad 769XD, 769XL	*8Meg/19Meg/32Meg*	*39/54/119*	*149*	*271*
Thinkpad 7659, 765L	*6Meg/16Meg/32Meg64Meg*	*29/49/99/179*	*149*	*271*
Thinkpad 770 (SDRAM)	16Meg/32Meg/64Meg	44/99/189		

COMPAQ MEMORY MODULES

Deskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Deskpro 575, 5120, 5133, 5150, 5160 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Deskpro 2000, 4000, 6000 Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Deskpro 2000, 4000, MMX	16Meg/32Meg/64Meg/128Meg	46/89/199/409
Deskpro 6000	16Meg/32Meg/64Meg/128Meg	61/99/229/489
Deskpro 5/60M, 5/66M, XE560 (quads)	4Meg/8Meg/16Meg/32Meg	18/39/54/89
Deskpro XL 6150, 6200 (ECC, pairs)	8Meg/16Meg/32Meg/64Meg, 128Meg	Call
Presario 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Presario 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Presario 2100,2120,2200,3020,3060 (EOD pairs)	4Meg/8Meg/16Meg/32Meg	14/23/39/79
Presario 4112, 4122, 4160, 4402 (E9O pairs)	4Meg/8Meg/16Meg/32Meg	14/23/39/79
Presario 4504, 4508, 4528 (SDRAM)	16Meg/32Meg	46/89
Presario 4704, 4706, 4710, 4712, 4714, 4716 (EOD pairs)	4Meg/8Meg/16Meg/32Meg	14/23/39/79
Presario 4764 4770, 4784, 4786 (SDRAM)	16Meg/32Meg	46/89
Presario 4808, 4814 (SDRAM)	16Meg/32Meg	46/89
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4Meg/8Meg/16Meg/32Meg	19/28/54/69
Proliant 1500, 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	18/39/54/89
Proliant 4500, 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	18/39/59/99/199
Proliant 5000, 5000R (pairs)	32Meg/64Meg/128Meg/256Meg	Call
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 5100, 5120, 5133, 5150, 5166 (EOD pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 575E, 100E, 120E, 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 590MX, 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 6150E, 6180E (pairs)	8Meg/16Meg/32Meg	34/49/79
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	18/34/59/89
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	18/34/59/89

COMPAQ NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH	Li-en
Armada 1100, 1120T, 1129, 1125	*8Meg/16Meg/32Meg/64Meg*	*34/54/99/199*	*104*	
Armada 1139, 1139T	*6Meg/16Meg/32Meg/64Meg*	*34/54/99/199*	*104*	
Armada 15100M, 15209M, 15500MT	8Meg/16Meg/32Meg/64Meg	49/54/99/189		
Armada 4100, 4110, 0, 4120, T, 4130T (pairs)	8Meg/16Meg/32/64Meg	39/69/99/199 ea		
Armada 7710MT, 7730MT, 7750DMT	16Meg/32Meg/64Meg	52/99/189		
Concerto 4/25, 433	*4Meg/6Meg/19Meg*	*39/54/69*	*195*	
Contura 4/25, 4/25C, 4/25CX	*4Meg/6Meg/19Meg*	*39/54/69*	*119*	
Contura 490C, 400CX, 419C, 410CX	*4Meg/8Meg/19Meg/24Meg*	*39/49/69/109*	*104*	
Contura 420C, 429CX, 430C, 439CX	*4Meg/8Meg/19Meg/24Meg*	*39/49/69/199*	*104*	
Contura Aero	*4Meg/8Meg/19Meg*	*39/49/69*	*104*	
LTE 5009, 5199, 5200, 5399	*8Meg/19Meg/32Meg/64Meg Kil*	*34/39/119/229*	*138*	
LTE Elita 440C, CX, 4/75CX	*4Mag/8Meg/19Meg/24Meg*	*39/54/69/199*	*138*	
LTE Lite 425	*4Meg/8Meg/19Meg*	*49/59/79*	*147*	
Presario 1009, 1919, 1920, 1039, 1979, 1980	*8Meg/19Meg/32Meg*	*29/49/99*	*119*	*217*
Presario 1297, 1210, 1910	*16Meg/32Meg/64Meg*	*44/99/194*	*112*	*239*

DELL MEMORY

Dimension XPS M166S, M2090, P133s, 166s, 200s, P133v, 166v, 200v (SDRAM)	8Meg/16Meg/32Meg	39/49/69
Dimension XPS P60, P75, P90, P100 (pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Dimension XPS P100c, 120c, 133c, 166c, XPS P75T, 100T (pairs) FPM or EDD	4Meg/8Meg/16Meg/32Meg	18/28/49/79
Dimension XPS Pro 150, Pro 200 (quads)	4Meg/8Meg/16Meg/32Meg	18/39/59/99
Dimension XPS Pro 150n, 180n, 200n (Edo pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Dphplex GL, GM, GMT (Edo pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Dptiplex GS, GXL, GXM, GXMT (Edo pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Dptiplex GXI, GXpro, 6180, 6200 (Edo, Ecc)	16Meg/32Meg/64Meg/128Meg	59/99/184/399
PowerEdge 2100, 4100 (Edo, Ecc)	16Meg/32Meg/64Meg/128Meg/256Meg	59/99/184/399/879

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	DK Bd	256k	1	2	3	3.5	4	5	6	8	16	32
Brother 630, 631, 641, 645	–	–	39	59	–	–	–	–	–	–	–	–
Canon LBP 430	–	–	19	–	–	–	29	–	–	–	–	–
Canon LBP 860, 1260	–	–	–	14	–	–	29	–	–	39	59	99
Epson Action Laser 1100, 1600	–	–	14	19	–	–	29	–	–	39	59	–
Epson Action Laser II	–	–	74	–	123	–	–	180	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	74	–	123	–	–	180	–	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	–	49	–	–	98	–	–	–	–	–
HP 2, 2D–	–	–	–	59	–	–	79	–	–	–	–	–
HP 3, 39, 3P, 2P+	–	–	–	*59*	–	–	*89*	–	–	–	–	–
HP 4 4M, 4SI, 4SIMX	–	–	–	14	–	–	29	–	–	59	–	–
HP 4L	–	–	29	–	–	–	–	–	–	–	–	–
HP 4MP, 4P	–	–	9	19	–	–	24	–	–	39	–	–
HP 4+, 4M+, 4V, 4MV	–	–	9	19	–	–	24	–	–	39	59	99
HP 5, 5M, 5MP, 5N, 5P, 5SI, 5MX	–	–	9	19	–	–	24	–	–	39	59	99
HP 5L, 6L	–	–	–	–	–	–	49	–	–	99	–	–
HP 6MP, 6P	–	–	9	19	–	–	24	–	–	39	59	99
HP Design Jet 200, 220	–	–	–	–	–	–	29	–	–	44	–	–
HP Design Jet 230, 250C	–	–	–	–	–	–	29	–	–	44	59	99
HP Design Jet 330, 350C	–	–	–	–	–	–	29	–	–	44	59	99
HP Design Jet 600, 650C	–	–	–	–	–	–	29	–	–	44	–	–
HP Design Jet 650C, PS	–	–	–	–	–	–	29	–	–	44	59	99
HP Design Jet 700, 750C, Plus, 755	–	–	–	–	–	–	29	–	–	44	59	99
HP Oeskjet 500, 500C, 510, 550, 560	–	29	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/PS, 1600C, 1600CM	–	–	–	–	–	–	29	–	–	44	–	89
IBM Laser 4019, 4019E	–	–	–	–	–	109	–	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	–	49	–	–	–	–	–
IBM Laser 4039, 4979	–	–	–	*39*	–	–	*99*	–	–	*99*	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	–	29	–	–	39	59	99
Lexmark Valuwriter 300,600	–	–	29	39	–	–	69	–	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	–	29	39	–	–	69	–	–	–	–	–
Lexmark S Series	–	–	–	–	–	–	–	–	–	–	–	109
NEC 90, 290	–	–	–	89	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	59	–	–	–	–	–	–	–	–
Dki 400E, 400EX, 410E, 410EX	–	–	67	89	169	–	189	–	–	–	–	–
Dki 810E, EX, 600E, EX, 610E, EX	–	–	29	79	–	–	119	–	–	149	229	–
Panasonic 4420/4450I	–	–	–	79	–	–	109	–	–	–	–	–
Panasonic 4419/4439	–	–	–	*59*	–	–	*199*	–	–	–	–	–
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Panasonic 6500	–	–	14	14	–	–	39	–	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	–	49	69	–	–	119	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	49	–	–	–	236	–	–	–	–	–

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MDDEL	AMT. UPGRADED	MEMORY PRICE	BAT NimH	Li-on
Libratto 59CT	*8Meg/16Meg*	*49/89*	*—*	*161*
Tecra 500C9T, CS, 510C9S, C9T	*8Meg/19Meg/32Meg/48Meg/128Meg*	*34/54/99/159/349*	*231*	*239*
Tecra 529CDT, 539C9T	*6Meg/19Meg/32Meg/46Meg/126Meg*	*34/54/99/159/349*	*259*	
Tecra 799CS, 790CT (S9RAM)	*8Meg/16Meg/32Meg*	*56/109/189*	*279*	*259*
Tacra 719C9T, 729C9T, 730C9T	*8Meg/16Meg/32Meg/64Meg/128Meg*	*49/69/119/169/359*	*279*	*259*
Tecra 739XCDT, 749CDT	*6Meg/19Meg/32Meg/64Meg/128Meg*	*49/69/119/169/359*	*279*	*259*
T2100 Series	*4Meg/8Meg/16Mag/24 Meg*	*29/39/69/99*	*104*	
T1900, T4500, T4600, T4700, T4900 All Models	*4Meg/8Meg/16Meg/32Meg*	*39/49/69/119*	*104*	
T2499, T3400, T3400CT, T3600CT	*4Meg/8Meg/16Meg*	*24/34/59*	*104, 119*	*203*
Satellite T100CS, 105CS, 119CS, 110CT, 115CS	*8Meg/16Meg/32Meg*	*46/69/114*	*104*	
Satellite 200CDS, 295CDS Series	*8Meg/16Meg/32Meg*	*46/66/114*	*104*	
Satellite 220C9S	*9Meg/16Meg/32Meg/48Meg/126Meg*	*34/49/99/159/349*	*198*	*208*
Satellite T499 Series, T600 Series	*8Meg/16Meg/32Meg*	*46/66/139*	*196*	*208*
Satellite Pro 440, 445, 460	*6Meg/19Meg/32Meg/48Meg/128Meg*	*34/49/99/159/349*	*196*	*208*
Portege 300	16Meg/32Meg	49/99		
Portege 659CT, 669CT	*6Mag/19Meg/32Meg/64Meg*	*34/49/99/179*	*—*	*219*

NOTEBOOK, LAPTOP MEMORY

MO9EL	AMT. UPGRADED	MEMORY PRICE	BAT NimH	Li-on
ACERNote 763, 765, 782, 784, 786	4Meg/8Meg/16Meg	19/29/54		
ACERNote Light 359, 352, 355	*4Meg/8Meg/16Meg*	*19/29/54*	*147*	
ACERNote Light 356, 358, 359, 361 (pairs) edo	*4Meg/6Meg/19Meg*	*21/34/54 ea*	*147*	
ACERNote Nuovo 971, 972, 372, 373, 374	8Meg/16Meg/32Meg	32/44/99		
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4Meg/8Meg/16Meg	21/34/54 ea		
AST Ascentia A41, A42	*8Meg/16Meg/32Meg/64Meg*	*29/44/99/179*	*154*	
AST Ascentia P30, P50	8Meg/16Meg/32Meg	54/69/129		
AST Ascentia J19, J39, J59 (pairs)	*4Meg/8Meg/16Meg/29Meg*	*22/34/59/69 ea*	*—*	*168*
AST Ascentia 809N, 619N, 999N, 919N	*4Meg/8Meg/16Meg*	*39/49/79*	*195, 147*	*167*
AST Ascentia 959N	*8Meg/16Meg*	*54/79*	*—*	*187*
AT&T Globalyst 139	*4Meg/8Meg/16Meg*	*19/29/54*	*193*	
AT&T Globalyst 209, 259, 259P	*4Meg/8Meg/19Meg/29Meg*	*44/49/79/129*	*155, 109*	
Austin DX4, DX2, SX2, SX Series	*4Meg/16Meg*	*99/199*	*126*	
Canon Innova Book 350CD, 369, 475	*8Meg/16Meg*	*29/54*	*119*	
Canon Innova Book 489, 490 EDD (pairs)	*8Meg/16Meg*	*29/54 ea*	*119*	
CTX EZ Book *500*, 600 Series	4Meg/8Meg/16Meg	22/29/54	*138*	
CTX EZ Book 700 Pent, Series (EOD) (pairs)	8Meg/16Meg/32Meg	29/54/119 ea	*138*	
CTX EZ Book 760MT, 765MT (EDD) (pairs)	8Meg/16Meg/32Meg	29/54/119 ea	*138*	
DEC HiNote	*4Meg/8Meg/16Meg*	*29/39/69*	*103*	
DEC HiNote Ultra, Ultra II	4Meg/8Meg/16Meg/32Meg	22/29/54/119		
OEC HiNote Ultra 2000	16Meg/32Meg/64Meg	44/99/189		
DEC HiNote VP 529,525,535,545/159MMX (pairs)	*4Meg/8Meg/16Meg*	*22/29/54 ea*	*119*	
DEC HiNote VP 5199, 5129	*8Meg/16Meg/32Meg/64Meg*	*29/49/99/199*	*119*	
DEC HiNote VP, CSS, LSS, CTS, LTS	*6Meg/16Meg/32Meg/64Meg*	*29/49/99/199*	*119*	
DEC HiNote VP700	16Meg/32Meg/64Meg	59/119/219		
Dell Inspiron 3000	16Meg/32Meg/64Meg	44/99/199		
Dell Latitude CP M233XT	16Meg/32Meg/64Meg	59/119/219		
Dell Lattitude LM, LM P166MMX (pairs)	*4Meg/8Meg/16Meg/32Meg*	*22/29/54/119 ea*	*—*	*245*
Dell Lattitude 433, C, CX	*4Meg/16Meg*	*49/89*	*119*	
Dell Lattituda LX, M	*4Meg/8Meg/16Meg*	*49/59/69*	*105*	
Oell Latitude XP, XPI, XPI CD M166ST	4 Meg/8Meg/16Meg/32Meg	22/29/54		
Epson ActionNote 659, 659c, 669c, 969cx	*4Meg/8Meg/19Meg*	*19/49/79*	*119*	
Epson ActionNote 689, 666c, 690, 919	*4Meg/8Meg/19Meg/29Meg*	*19/34/64/136*	*119*	
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-59, 4090	*6Meg*	*69.99*	*79*	
Fujitsu Lifebook 499, 500, 699 Series	*16Meg/32Meg/64Meg*	*44/99/189*	*103*	*203*
Fujitsu Lifebook 599, 699, 709 Series	*16Meg/32Meg/64Meg*	*44/99/189*	*103*	*203*
Fujitsu Monte Carlo, Montego, Milan	*8Meg/19Meg/32Meg*	*29/44/99*	*—*	*203*
Gateway 2900 Colorbook 4/33	*4Meg/16Meg*	*69/179*	*112*	
Gateway 2000 Solo Series (pairs)	4Meg/8Meg/16Meg	22/32/54 ea		
Gateway Solo Series 2100, 2200 edo	8Meg/16Meg/32Meg	52/79/179		
Gateway Solo 9000, 9100, 2300	16Meg/32Meg/64Meg	44/99/189		
Hitachi C-Series	8Meg/16Meg/32Meg	29/44/99		
Hitachi E-Series, MMX Series	*8Meg/19Meg/32Meg*	*49/69/129*	*119*	
Hitachi M-Series	*8Meg/16Meg/32Meg*	*49/69/129*	*104*	
Hitachi Visionbook Elite, Plus, Pro	*8Meg/16Meg/32Meg/64Meg*	*29/44/99/179*	*154*	*217*
HP 9mnibook 800	*6Meg/16Meg/32Meg/64Meg*	*49/69/119/189*	*—*	*145*
HP Dmnibook 4009C, CT, C	*4Meg/8Meg/16Meg*	*39/54/74*	*126*	
HP Dmnibook 5999CT, CTS, C, 5599CS	*6Meg/16Meg/32Meg/64Meg*	*49/69/119*	*126*	
Micron MilleniaTransport Pentium (pairs), MRX	8Meg/16Meg	29/44 ea		
Micron MilleniaTransport VLX P133 (pairs)	4Meg/8Meg/16Meg	22/34/49 ea		
Micron MilleniaTransport XKE P166MMX	16Meg/32Meg/64Meg	44/99/189		
Midwest Micro Elite or Soundbook Plus or Sndbk II, IIP	*4Meg/8Meg/19Meg*	*44/69/199119*		
Midwest Micro Elite or Soundbook CD	4Meg/8Meg/16Meg	22/32/54		
NEC Ultralite Versa, E, V, MP	*4 Meg/8Meg/19Meg/32Meg*	*9/29/69/129*	*133*	
NEC Versa S, Versa 2000C, 9, 2205C	*4Meg/6Meg/19Meg*	*22/34/54*	*103*	
NEC Versa 2409 Series, 2530, 2535 (pairs)	*9Meg/19Meg/20Meg*	*32/54/129 ea*	*199*	
NEC Versa 2600 Series (pairs)	4Meg/8Meg/16Meg/32Meg	22/34/59/149 ea		
NEC Versa 4000, 4050/4080, 4200, 4230	4Meg/8Meg/16Meg/20Meg	44/54/69/109/129		
NEC Versa 6000, 6050, 6030	8Meg/16Meg/32Meg/64Meg	54/69/119/189		
NEC Versa 6200MX edo	8Meg/16Meg/32Meg/64Meg	32/44/99/179		
Packard Bell Statesman	*2Meg/8Meg*	*29/64*	*198*	
Panasonic CF-V21P, CF-580	*4Meg/8Meg19Meg32Meg*	*44/54/76/139*	*126*	
Panasonic CF-V41P Series	*4Meg/8Meg/19Meg/32Meg*	*44/54/79/134*	*129*	
Panasonic CF-62 P100, P133	8Meg/16Meg/32Meg/64Meg	32/44/99/189		
Sager Midern, all models	*4Meg/8Meg/19Meg/32Meg*	*29/49/69/239*	*Call*	
Samsung Sens 810, 500	8Meg/16Meg/32Meg	54/79/129		
Sharp 3030, 3040, 3070	8Meg/16Meg/32Meg	59/79/149		
Sharp 3919, 3029, 3059, 3069	*4Meg/8Meg/19Meg/32Meg*	*49/59/69/199*	*133*	
Sharp 8150, 8659, 8660, 7700, 7760	*4Meg/19Meg*	*39/79*	*131*	
Sharp 8700, 8899, 9900	*4Meg/8Meg/19Meg*	*39/49/69*	*124*	
Sharp 9009, 9039, 9929, 9059, 9399CD, T edo	*8Meg/19Meg/32Meg*	*49/69/129*	*299*	*252*
Sharp 9040, 9070 (pairs)	4Meg/8Meg/16Meg/32Meg	22/32/54/169 ea		
Sharp 9080 (pairs) edo	4Meg/8Meg/16Meg	22/32/54 ea		
Sharp Widenote 100T	8Meg/16Meg/32Meg	39/69/139		
Sony VAID PCG-750C, 707C, 719	16Meg/32Meg/64Meg	42/99/189		
TI 4000, TI 4999E, TI 4009M	*4Meg/19Meg*	*49/399*	*98, 119*	
TI 5099, 5100, 5299, 5300	*8Meg/19Meg*	*49/79*	*—*	*189*
TI 6920, 6030, 6050, 6160	*8Meg/19Meg*	*32/44*	*—*	*215*
TI Extensa, 459, 459T, 455, 455T	*4Meg/8Meg/16Meg*	*22/32/54*	*147*	
TI Extensa, 510, 515 (pairs) ado	*4Meg/8Meg/19Meg*	*22/39/69 ea*	*147*	
TI Extensa, 559, 555, 599, 595, 579 (pairs)	*4Meg/8Meg/19Meg*	*22/39/69 ea*	*191*	
TI Extensa, 699, 905, 950, 909, T, CDT edo	*8Meg/16Meg/32Meg*	*32/44/99*	*147*	
Twinhead, Altima, Compudyne, 486SX, 9X, Tandy 4860	*4Meg/19Meg*	*49/109*	*135*	
Winbook FX P199, P133, P150	*8Meg/16Meg*	*59/79*	*—*	*329*
Winbook XL	16Meg/32Meg/64Meg	44/99/179		
Winbook XPC, XP	*19Mag/32Meg*	*69/129*	*112*	*217*
Winbook XP5	*32Meg*	*134*	*112*	*217*
Winbook XP5 Pro	8Meg/16Meg32Meg	69/119/229		
Zenith Z-Star EX, ES	*4Meg/19Meg*	*22/54*	*89*	
Zenith Z-Note 6200 P166MMX	8Meg/16Meg/32Meg/64Meg	29/44/99/189		

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Deskpro 4000S desktops
166/MMX 16MB 2.1GB 868.67
200/MMX 16MB 2.1GB 996.48
233/MMX 32MB 2.1GB 1176.78
Deskpro 6000 desktops
233/PII 32MB 2.1GB 24X 1898.67
266/PII 32MB 2.1GB 24X 2085.27
266/PII 32MB 4.3GB 24X 2279.77
300/PII 64MB 4.3GB 24X 2689.87
Deskpro 6000 mini-towers
266/PII 64MB 4.3GB 24X 2486.67
300/PII 32MB 4.3GB 24X 2729.67
Presario desktops
200/MMX 32MB 2.1GB 20X 746.00
233/MMX 32MB 3.2GB 20X 946.00
233/MMX 48MB 4GB 24X 1096.00
266/PII 48MB 4GB DVD 1496.00
300/PII 64MB 8GB DVD 1796.00
333/PII 64MB 8GB DVD 2296.00

Deskpro 2000

Small Business Edition COMPAQ

Monitor sold separately

- 200MHz Intel Pentium® processor with MMX™ technology
- 512KB Level 2 cache
- 32MB SDRAM standard
- 2.4GB Ultra ATA hard drive
- 16X Max CD-ROM drive
- Microsoft Office 97 Small Business Edition

$1319.78 CDW 110829

PC 300GL Series desktops
166/MMX 16MB 2.5GB 838.47
166/MMX 32MB 2.5GB 898.77
200/MMX 32MB 2.5GB 977.25
200/MMX 32MB 2.5GB 16X 1087.75
233/MMX 32MB 2.5GB 1037.52
233/PII 16MB 2.5GB 1067.35
233/PII 32MB 2.5GB 1127.58
233/PII 32MB 4.2GB 1187.15
266/PII 32MB 2.5GB 1187.55
266/PII 32MB 4.2GB 1237.58
266/PII 32MB 4.2GB 32X 1397.25
300/PII 32MB 4.2GB 1457.72
300/PII 32MB 4.2GB NT 1537.45

PC 300PL Series desktops
200/MMX 32MB 2.5GB 1147.95
200/MMX 32MB 4.2GB 1187.75
200/MMX 32MB 4.2GB 24X 1287.38
233/MMX 32MB 4.2GB 1247.56
233/MMX 32MB 4.2GB 24X 1347.65
PC 300PL Series mini-towers
166/MMX 32MB 2.5GB 1087.84
200/MMX 32MB 4.2GB 24X 1298.75
233/MMX 32MB 4.3GB 24X 1697.56
PC 300XL Series desktops
233/PII 32MB 2.5GB 1699.75
233/PII 32MB 2.5GB 16X 1889.75
266/PII 32MB 2.5GB 1949.69
266/PII 32MB 4.3GB 16X 2519.68
300/PII 32MB 4.2GB 16X 2476.89

HP Vectra VL 7 Series PC

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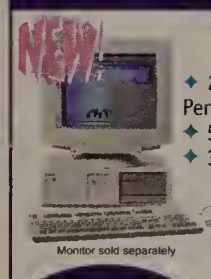

Monitor sold separately

- 233MHz Intel Pentium® II processor
- 512KB Level II cache
- 32MB EDO DRAM standard
- 3.2GB EIDE hard drive
- 24X Max CD-ROM
- Windows® NT Workstation V4.0 or Windows 95

$1277.85 CDW 108943

HP Brio Series mini-towers
166/MMX 16MB 2.1GB 859.76
166/MMX 16MB 2.1GB 16X 1074.57
200/MMX 16MB 2.1GB 887.57
233/PII 32MB 4GB 1249.76
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200/MMX 32MB 2.1GB 16X 1158.45
233/MMX 32MB 3.2GB 1088.84
233/MMX 32MB 3.2GB 24X 1295.73
233/PII 4GB 24X 1467.88
266/PII 4GB 24X 1589.87
300/PII 8GB 32X 1875.97
200/MMX 32MB 2.1GB 24X 1157.58
200/MMX 32MB 2.1GB 24X 1146.28
233/MMX 32MB 4GB 24X 1298.45
233/MMX 32MB 6GB 24X 1518.77
266/PII 32MB 8GB 32X 56K bps 1686.78
300/PII 64MB 8GB 32X 56K bps 2356.48
HP VE 4 Series desktops
200/MMX 16MB 2.1GB 959.98
200/MMX 32MB 2.1GB 24X 1194.67
200/MMX 32MB 3.2GB 1139.68
233/MMX 32MB 2.1GB 1059.67
233/MMX 32MB 2.1GB 24X 1295.78
HP VE 4 Series mini-towers
200/MMX 32MB 3.2GB 1259.44
233/MMX 32MB 3.2GB 1368.87
HP VL 7 Series desktops
233/PII 32MB 3.2GB Win 95 ....1277.85
233/PII 32MB 3.2GB 1328.38
266/PII 64MB 4.3GB 24X 2098.76
300/PII 64MB 4.3GB 24X 2366.78
HP VL 7 Series mini-towers
233/PII 32MB 4.3GB 24X 1759.57
266/PII 64MB 6.4GB 24X 2218.85
333/PII 64MB 6.4GB 24X 2544.88

Acer

200/MMX 16MB 3.2GB 32X 929.87
200/MMX 32MB 4.3GB 32X 1084.46
233/MMX 32MB 4.3GB 32X 1087.36
200/MMX 32MB 2.1GB 10/100 ....928.46

TOSHIBA

Equium Series desktops
233/MMX 3GB 32MB 1496.57
233/MMX 2GB 32MB 1249.37
233/MMX 3GB 32MB 24X 1378.67
266/PII 4GB 32MB 24X 1536.47
233/MMX 2GB 32MB 1358.77
300/PII 4GB 32MB 24X 1657.37

NOTEBOOKS

TOSHIBA

Libretto mini-notebooks
50CT 5/75 16MB 772MB 6.1" AM 997.56
70CT 120/MMX 16MB 1.5GB 6.1" AM 1687.36
Satellite & Satellite Pro notebooks
440CDX 133/MMX 16MB 1.34GB 12.1" DS 10X 1357.06
440CDT 133/MMX 16MB 1.34GB 12.1" AM 10X 1687.36
460CDX 166/MMX 32MB 2GB 12.1" DS 10X 1737.86
470CDT 200/MMX 32MB 2.1GB 12.1" AM 10X 2857.45
480CDT 233/MMX 32MB 3.8GB 12.1" AM 10X 3387.56
Tecra notebooks
520CDT 166/MMX 32MB 3.8GB 12.1" AM 10X 2837.56
530CDT 166/MMX 32MB 3.8GB 12.1" AM 10X 3127.26
550CDT 266/MMX 32MB 3.8GB 12.1" AM 3847.63
740CDT 166/MMX 16MB 3GB 13.3" AM 10X WIN NT 2997.15
740CDT 166/MMX 16MB 3GB 13.3" AM 10X 2727.96
750CDT 233/MMX 32MB 4.7GB 13.3" AM 20X 4794.85
750CDM 133/MMX 32MB 4.77GB 13.3" AM 20X 4787.16
750DVD 233/MMX 64MB 4.77GB 13.3" AM DVD 4987.69
Portege notebooks
320CT 266/MMX 32MB 3.8GB 10.4" AM 3567.56

Satellite Pro 470CDT

TOSHIBA

- 200MHz Intel Pentium® processor with MMX™ technology
- 32MB EDO DRAM standard
- 2.02GB hard drive
- 10X CD-ROM drive
- 12.1" active-matrix display
- 33.6K bps internal data/fax modem

$2857.45 CDW 107597

Acer

Extensa notebooks
392C 150/MMX 16MB 2.1GB 12.1" DS 20X 1347.29
391T 150/MMX 16MB 2.1GB 12.1" AM 20X 1837.86
392T 166/MMX 32MB 3GB 12.1" AM 20X 2127.86
TravelMate notebooks
7120T 200/MMX 32MB 3GB 12.1" AM 20X 2957.49
7130TE 233/MMX 32MB 3GB 13.3" AM 20X 3397.89
TM7164TE 266/MMX 32MB 4.1GB 13.3" AM 3857.42

COMPAQ

Armada notebooks
1530DM 133/MMX 16MB 1.4GB 12.1" DS 10X 1179.00
1540DM 150/MMX 16MB 2.1GB 12.1" DS 20X 1787.49
1571DM 200/MMX 32MB 3.2GB 12.1" DS 20X 2437.22
1580DMT 150/MMX 16MB 2.1GB 12.1" AM 10X 2437.46
1598DMT 266/MMX 32MB 4GB 13.3" AM 20X 3617.46
4131T 5/133 16MB 1.4GB 12.1" AM 997.86
4210T 233/MMX 32MB 3GB 12.1" AM 3477.36
4220T 266/MMX 32MB 4GB 12.1" AM 3967.88
7330T 150/MMX 16MB 2.1GB 12.1" AM 1467.36
7360DMT 200/MMX 32MB 3GB 12.1" AM 3297.65
7380DMT 266/MMX 32MB 4GB 12.1" AM 4997.56
7710MT 150/MMX 16MB 1.6GB 12.1" AM 1897.79
7770DMT 233/MMX 32MB 3GB 12.1" AM 20X 3699.89
7792DMT 266/MMX 32MB 5GB 13.3" AM 20X 5457.89

COMPAQ

Presario notebooks
1220 200/MMX Media GX 32MB 2.1GB 12.1" AM 20X 1796.00
1622 233/MMX 32MB 3.2GB 12.1" DS 20X 2496.00
1681 233/MMX 48MB 2.1GB 12.1" AM 20X 2996.00
1710SB 166/MMX 32MB 2.1GB 12.1" DS 20X 1696.00

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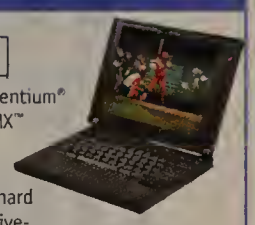
HP OmniBook 800 Series notebooks
800CT 166/MMX 16MB 2GB 10.4" AM 3679.68
HP OmniBook 3000 Series notebooks
200/MMX 16MB 2.1GB 13.3" AM 2967.45
233/MMX 16MB 4GB 13.3" AM 3457.36
HP OmniBook 5700 Series notebooks
166/MMX 16MB 1.86GB 12.1" AM 2327.36
166/MMX 32MB 2.79GB 12.1" AM 2957.48

IBM ThinkPad® 560X



- 233MHz Intel Pentium® processor with MMX™ processor
- 32MB RAM standard
- 4GB hard drive
- 12.1" active-matrix color display
- Integrated TrackPoint III pointing device
- Windows® 95

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ThinkPad notebooks
380ED 166/MMX 16MB 2.1GB 12.1" DS 20X 1557.29
380ED 166/MMX 16MB 3GB 12.1" AM 20X 2237.71
380XD 233/MMX 32MB 3.2GB 12.1" DS 24X 2047.13
380XD 233/MMX 32MB 4GB 12.1" AM 24X 2637.92
380XD 266/MMX 32MB 5.1GB 12.1" AM 24X 2997.37
560E 166/MMX 16MB 2.1GB 12.1" AM 2436.64
560X 200/MMX 32MB 2.1GB 12.1" AM 2137.67
560X 233/MMX 32MB 4GB 12.1" AM 2997.86
770 200/MMX 32MB 3.2GB 13.3" AM 2917.36
770 233/MMX 32MB 4GB 13.3" AM 3457.89
770 233/MMX 32MB 5.1GB 14.1" AM 4197.26

FUJITSU

LifeBook 500 Series notebooks
565Tx 166/MMX 32MB 2GB 12.1" AM 20X 2499.00
LifeBook 600 Series notebooks
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HITACHI

VisionBook Plus Series notebooks
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VisionBook Pro Series notebooks
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AMS Tech

Travel Pro 1000 Series notebooks
1965CT 200/MMX 16MB 2.1GB 12.1" AM 10X 2297.45
1970CT 233/MMX 48MB 3.1GB 12.1" AM 20X 2617.23
Travel Pro 2000 Series notebooks
2010CX 166/MMX 32MB 2.1GB 13.3" AM 20X 2557.64
2030CX 200/MMX 48MB 3.1GB 13.3" AM 16X 2897.38
2035CX 233/MMX 32MB 3.1GB 13.3" AM 20X 2887.62
Rodeo 3000 Series notebooks
3000ECX 166/MMX 32MB 3.1GB 14.1" AM 20X 3017.23
3015ECX 233/MMX 32MB 2.1GB 14.1" AM 20X 3367.74
Rodeo 5000 Series notebooks
5010ECX 233/MMX 64MB 3.1GB 14.1" AM 20X 3587.32
5030ECX 266/MMX 64MB 4GB 14.1" AM 20X 3997.51

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3C562D-TP EtherLink III 33.6 PC Card 10BT 259.16
3C905-TX Fast EtherLink XL 10/100 PCI 88.46
3C900-TPO EtherLink XL 10BT PCI 109.16
3C900-COMBO Ethernet XL PCI combo 129.25
Courier 56K modem x2 internal 209.29
Courier 56K modem x2 external 245.73
Impact IQ ISDN modem external 199.95
OfficeConnect 4-port hub 59.47
OfficeConnect 8-port hub 78.49
OfficeConnect ISDN LAN modem 386.86
SuperStack II Hub 12-port 10BT 498.76
SuperStack II Hub 24-port 10BT 859.04

COMPAQ

Prosignia 200 servers
233/PII 32MB no hdd 16X EIDE10/100 Enet 1469.00
233/PII 32MB no hdd 16X SCSI 10/100 Enet 1695.00
233/PII 32MB 4.3GB 16X SCSI 10/100 Enet 2090.00
233/PII 64MB 4.3GB 16X 10/100 Enet 4669.00
ProLiant 800 and 850R servers
6/200 32MB no hdd 8X 10BT Enet 2159.00
6/200 32MB 4.3GB 8X 10BT Enet 2825.00
6/200 32MB no hdd 8X 10/100 Enet 3068.00
6/200 32MB no hdd 8X 10/100 Enet hot plug rack model 3295.00
ProLiant 1200 servers
233/PII 32MB no hdd 10/100 Enet 2859.00

D-Link

DE-805TP/C 5-port HUBBY 48.99
DE-6504 Ethernet PC Card 79.33
DFE-904 4-port dual-speed mini hub 91.40
DES-3205 FlexSwitch 5-port Ethernet switch 1139.76

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HP NetServer E 45 servers
233/PII 32MB no hdd 24X 10/100 Enet 1588.68
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266/PII 32MB no hdd 24X 10/100 Enet 1697.85
266/PII 32MB 4.2GB 24X 10/100 Enet 2175.87
266/PII 64MB 4.2GB 24X 10/100 Enet 2084.55

IBM

PC Server 325 servers
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233/PII 32MB 4.5GB 8X 3165.67
266/PII 64MB no hdd 8X 1889.77
266/PII 64MB no hdd 8X rack model 1697.88
PC Server 330 servers
6/200 64MB no hdd 8X 3718.27
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266/PII 64MB no hdd 8X 2084.55

intel

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NetportExpress PRO/100 3-port print server 349.86
InBusiness 8-port hub 76.17
InBusiness 8-port Fast hub 345.46
InBusiness Internet Station 5-port hub 389.93
Express 510T 24-port 10/100 switch 2799.88

LINKSYS

Combo Ether16 LAN card 36.14
Combo EtherPCI LAN card 49.17
Combo PC/Ethernet card 10BT 69.07
10BT 5-port workgroup hub 42.74
EtherFast 10/100 LAN PC Card 86.70
StackPro 16-port 100BTX rackmount hub 429.24

NETGEAR

10/100 Fast Ethernet PCI adapter 29.86
EN104TP 4-port 10BT slimline Ethernet hub 42.26
EN108TP 8-port 10BT slimline Ethernet hub 56.58

Seagate Software

Backup Exec for Windows NT V7.0 single-server edition version upg 239.59
Backup Exec for Windows NT V7.0 enterprise edition version upg 364.28
Backup Exec for Windows NT V7.0 single-server edition 428.17
Backup Exec for Windows NT V7.0 enterprise edition 789.88
Backup Exec for NetWare V7.5 25-user single-server edition 307.58

SMC

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EtherEZ 5T 10BT hub 38.46
EtherEZ 16TC 10BT hub 148.51
EtherPower II 10/100 PCI 46.13

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HP Colorado 8GB TBU w/media external 305.70
HP SureStore DAT24 24GB TBU internal 1209.68
HP SureStore DAT24 24GB TBU external 1329.23
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Zip drive 100MB parallel 139.95
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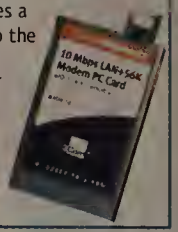

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Logitech Trackman Marble 59.95
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Epson PhotoPC 600 XGA digital camera 499.00
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Kodak DC210 Zoom digital camera 799.00
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Microtek ScanMaker E3 Plus 145.06
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EPSON

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HP DeskJet 1000Cse color printer 387.07
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HP Color LaserJet 5 printer 3939.21
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Optra S 1250 ..... 999.94
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Optra S 1650 ..... 1089.28
Optra S 2420 ..... 1546.38
Optra S 2450 ..... 1979.48
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MAG InnoVision DJ700 17" (16.1" view) 0.26mm 499.29
MAG InnoVision DJ800 19" (18" view) 0.26mm 679.14
NEC MultiSync E500 15" (13.8" view) 0.25mm 309.43
NEC MultiSync E700 17" (15.6" view) 0.25mm 566.33

MONITORS

NEC MultiSync E1100 21" (19.8" view) 0.28mm 1059.80
NEC MultiSync LCD400 14.1" flat panel LCD 1899.00
Philips Magnavox 105S 15" (13.8" view) 0.28mm 187.78
Philips Magnavox 107S 17" (15.9" view) 0.28mm 347.30
Philips Magnavox CM5600 20" (18.9" view) 0.28mm 969.02
Princeton E050 15" (13.8" view) 0.28mm 238.64
Princeton E070 17" (15.8" view) 0.28mm 389.14
Princeton E090 19" (18" view) 0.26mm 699.53
Sony Multiscan 100GS 15" (14" view) 0.25mm 349.24
Sony Multiscan 200ES 17" (16" view) PnP 0.25mm 548.76
Sony Multiscan 300SF 20" (19" view) PnP 0.30mm 1129.56
ViewSonic E771 17" (16" view) 0.27mm 389.54
ViewSonic G773 17" (16" view) 0.26mm 469.00
ViewSonic GS771 17" (16" view) 0.27mm 469.00
ViewSonic G790 19" (18" view) 0.26mm 779.27
ViewSonic G810 21" (20" view) 0.25mm 989.87
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ViewSonic VPA150 ViewPanel 15" active LCD 2024.37

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3Com 33.6K cellular 228.99
3Com 33.6K 10BT LAN+modem 259.16
3Com 33.6K 10BT LAN+modem combo 299.83
3Com 56K w/XJACK 214.66
3Com 56K cellular w/XJACK 214.66
Hayes ACCURA 56Kflex 184.16
Hayes OPTIMA 56K 199.24
Hayes OPTIMA 56K w/EZjack 199.24
Intel EtherExpress PRO/100 16-bit PC Card Enet/56K 309.44
Practical Peripherals 56Kflex cellular 166.41
Simple 33.6K Communicator w/SimpleJack 139.89
Simple 33.6K cellular 149.53
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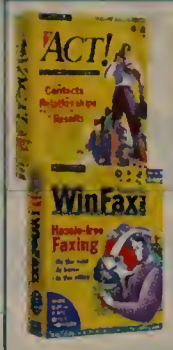

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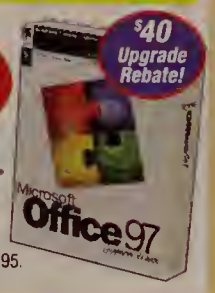

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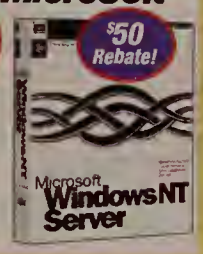

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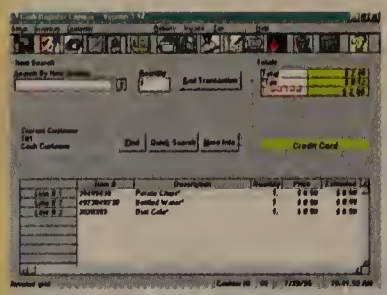

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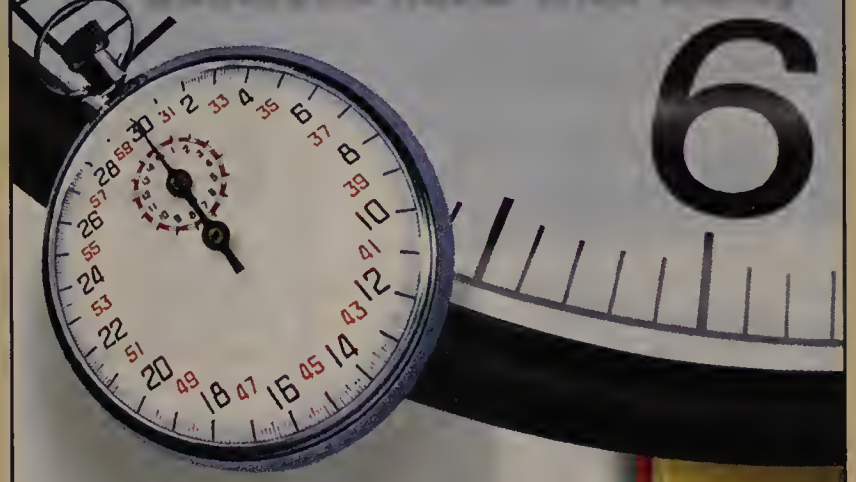

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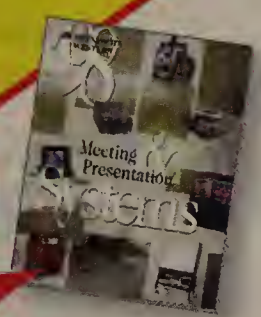

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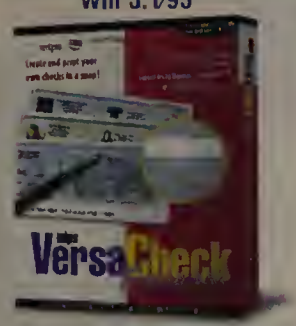

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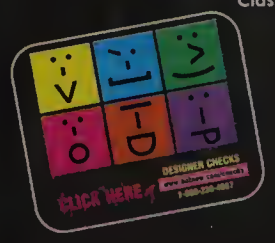

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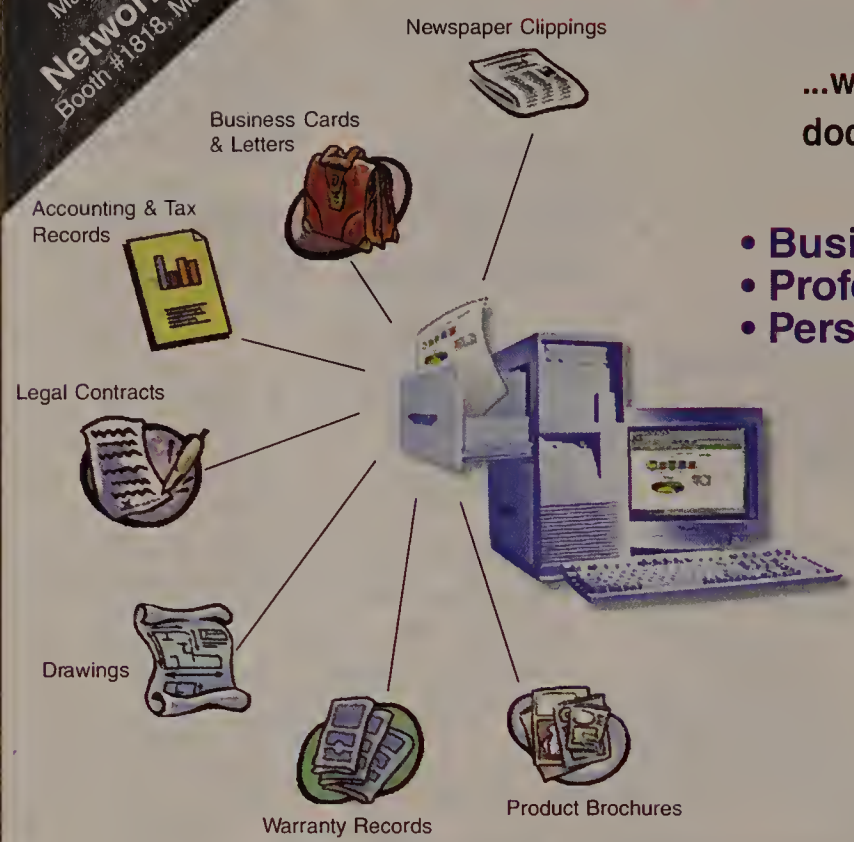

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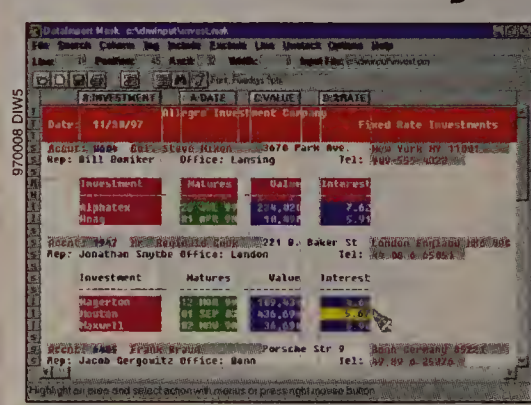

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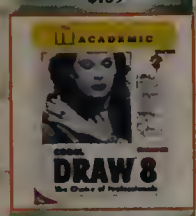

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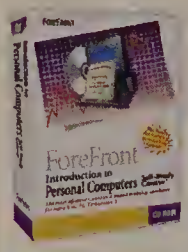

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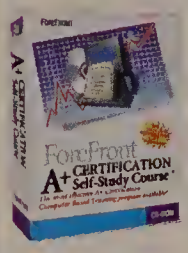

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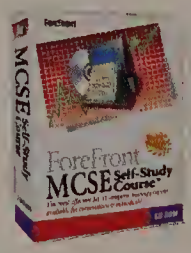

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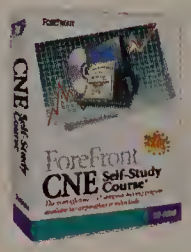

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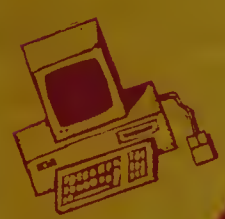

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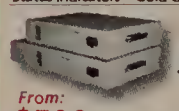

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Benefits :
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Features :
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Gold Diagnostic Adapters

Styles : Gender Changers
- Both 50 pin and 68 pin (all combinations)

Gender Changer

Drive Bus Changer (run 68 pin on 50 pin bus)

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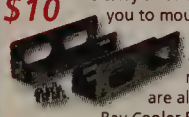

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Now you can safely remove any SCSI device from a SCSI chain by simply clicking a switch. The Hot Swap Powered Terminator also has an optional Power Supply so that it can supply termination power to portable setups or when termination power is not being supplied.

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SCSIVue™ Gold Diagnostic Cables

Benefits :
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- Faster Performance
- Test Cable Integrity

Features :
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- Double Gold 20u" Plated Connectors
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From: $159

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Features :
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- Triple Pronged Connector With Gold contacts

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- Test Cable Integrity
- No Loss Of Important Data

Features :
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- Diagnostic Indicators • Large Ferrite Filters

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From: $999

14 & 29 Bay - *The Ultimate Large SCSI Storage Solutions*
Shown with optional Bay Coolers and Dual Redundant Power Supply. Multiple SCSI Channel Support and Modular Designed Expansion.

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Fast SCSI Drives get HOT...but don't worry we have the perfect solution. Our new Dual Fan SCSI Cases keep any drive cool. Temperature is a drives worse enemy.

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Granite Cables Are The Best Because They're Engineered Right.

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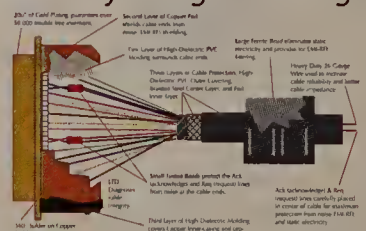

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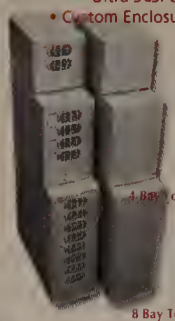

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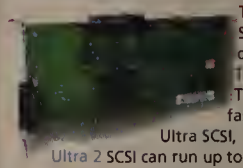

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In re
MICROPOLIS (USA) INC., a Delaware corporation,
Debtor.

Bk. No. LA 97-53352-LF
Chapter 11

NOTICE OF COURT ORDER ESTABLISHING BAR DATE FOR FILING PROOFS OF CLAIM OR INTEREST – JUNE 12, 1998

TO ANY PERSON OR ENTITY WHO ASSERTS A CLAIM AGAINST THE DEBTOR HEREIN BASED UPON ANY WARRANTY OR BREACH OF WARRANTY:

PLEASE TAKE NOTICE that the United States Bankruptcy Court for the Central District of California has entered an order setting a bar date for the filing of proofs of claim or interest in this Chapter 11 case. Pursuant to that order you are hereby given notice that any person or entity that asserts a claim against the Debtor based upon any warranty or breach of warranty must file a Proof of Claim on or before **June 12, 1998** if that person or entity wishes to participate in this case, vote on a Plan of Reorganization or share in any distribution in this Chapter 11 case. Any such person or entity who fails to timely file a Proof of Claim shall nevertheless be bound by the terms of any plan of reorganization confirmed by the Court.

ALL PROOFS OF CLAIM MUST BE FILED WITH THE CLERK OF THE COURT, UNITED STATES BANKRUPTCY COURT, CENTRAL DISTRICT OF CALIFORNIA, 300 NORTH LOS ANGELES STREET, FIRST FLOOR, LOS ANGELES, CALIFORNIA 90012. COMPLETE COPIES OF ALL PROOFS OF CLAIM MUST BE SERVED UPON COUNSEL FOR THE OFFICIAL COMMITTEE OF UNSECURED CREDITORS AT THE ADDRESS SET FORTH BELOW:

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06/98

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959 Multimedia products
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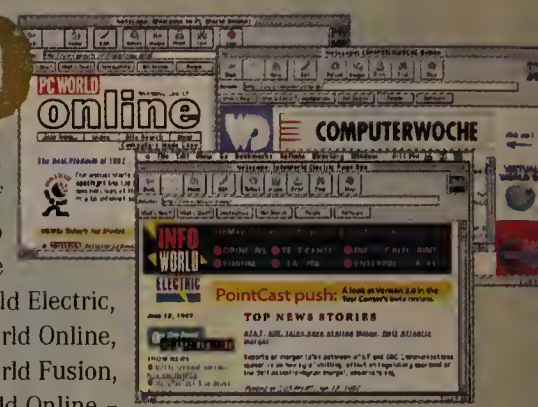

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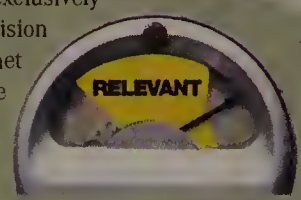

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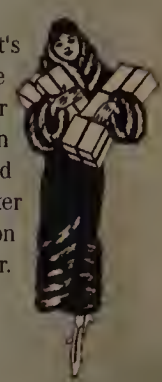

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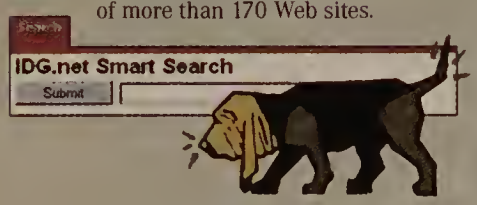

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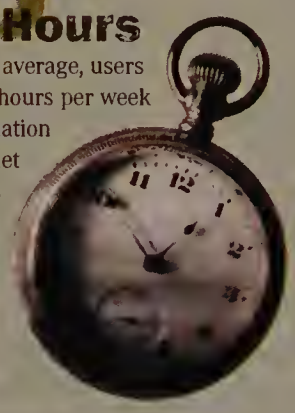

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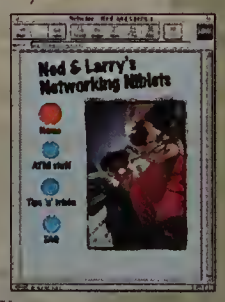

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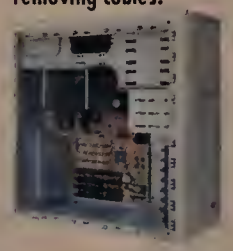

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But plenty of things in the world of computing still obey one of Newton's laws: A body at rest tends to remain at rest. Such Newtonian items improve not along a fast-rising curve, but in fits and starts. For reasons good and bad, these tenacious bottlenecks tend to survive long past their expected pull date.

"What's **surprising** is how slowly replacements **take root** in a world where most things **move like** lightning."

A FISTFUL OF BUSES

TAKE THE ISA BUS, which dates back to the first IBM PC. In an age when everything is getting faster, you might have expected this sluggish interface to have died long ago. Instead, like Ol' Man River, it just keeps rollin' along.

Why? Remember the spaghetti western, *For a Few Dollars More*? That's the price difference modem and sound card makers face if they switch to PCI. In the era of sub-$1000 PCs, every penny counts. And plenty of folks with ISA cards, particularly in corporate settings, would howl if those slots vanished—even though the ones in modern PCs are often useless because the free IRQ lines they need are unavailable.

The RS-232 serial port has been around even longer. Improved UART chips have made it faster, but even at 115,200 bits per second it can't always keep up. The serial port has survived solely because of the enormous base of peripherals that attach to it. And in a vicious circle, new devices that use the port continue to arrive because manufacturers can count on finding it in every machine.

The parallel port traces its origins to the days when people bought printers from an innovative company called Centronics. Now, it's the port of choice for scanners and outbound storage devices, despite the fact that most PCs come with only one, which is usually occupied by a printer. You end up with pass-through ports passing through pass-through ports, unless you get a switch box. Either way it's a kludge. But penny-pinching manufacturers rarely offer SCSI as a standard.

FLOPPY PERSISTENCE

THEN THERE'S THE remarkably resilient floppy disk. Though the 5.25-inch model has gone the way of the rotary phone, the 3.5-inch disk is still going strong. Why? It's cheap and handy for distributing small files, and higher-density formats like SuperDisk and HiFD that can read it should keep it alive a while longer.

What's surprising is how slowly replacements take root in a world where most things move like lightning. Case in point: the Universal Serial Bus. Though it has appeared on practically all desktops since early last year, relatively few USB peripherals exist as yet. FireWire—or IEEE 1394—ports, regarded as an even greater improvement, are virtually invisible. And though observers widely predict that DVD-ROM drives will supplant CD-ROMs later this year, every prognosis about DVD so far has been about as accurate as a Microsoft promise.

Some delays have been blamed on the lack of native support in Windows 95 and the late arrival of its successor. But that's just part of the story. Once a standard is entrenched, it tends to survive unless its replacement offers an easy upgrade path. One thing that got Windows 3.0 going was its ability to run DOS programs in multiple windows, allowing users to upgrade slowly. Chips and hard drives move ahead quickly because they offer improvements without forcing users to give up what they already have. Painless enhancements arrive promptly; others take much, much longer.

But a little enforced stability isn't all bad. Do you really want to buy a new printer every few years just so it'll work with some new high-speed port? So when a pundit spouts off about Moore's Law, don't forget Newton's. Advances in chip technology may be astonishing, but never underestimate the power of inertia.

PC World *Contributing Editor Stephen Manes is a columnist for the* New York Times *and is half of the* Digital Duo, *a technology program on public television.* ■

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